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SAN FRANCISCO MASTER PLAN FOR WASTE WATER MANAGEMENT

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SUPPLEMENT I

June 1, 1973

San Francisco

PREPARED BY
DEPARTMENT OF PUBLIC WORKS
MAY 15, 1973

4953

SAN FRANCISCO MASTER PLAN FOR WASTE WATER MANAGEMENT

SUPPLEMENT I

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MAY 15, 1973

SECOND PRINTING
JUNE 1, 1973

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San Francisco master
plan for waste water
1973.

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PREPARED FOR THE

DEPARTMENT OF PUBLIC WORKS

BUREAU OF ENGINEERING

BY THE

DIVISION OF SANITARY ENGINEERING

ALAN O. FRIEDLAND

PRINCIPAL ENGINEER

WITH SPECIAL REFERENCE TO THE

"EVALUATION OF THE MASTER PLAN FOR MANAGEMENT OF WASTEWATER"

BY

J. B. GILBERT & ASSOCIATES

PLANNING & ENGINEERING CONSULTANTS

ROBERT C. LEVY

CITY ENGINEER

S. MYRON TATARIAN

DIRECTOR OF PUBLIC WORKS

PREFACE

In September 1971, the Department of Public Works submitted a report entitled "San Francisco Master Plan For Wastewater Management" to the Joint Board of Supervisors' Health and Environment and Finance Committees. This report has been widely distributed to public and private agencies and individuals who are concerned with water pollution control problems.

During the past two years since the initial submission of the Master Plan report, a number of major actions have been taken by the Federal, State, and Regional regulatory agencies, including revisions to Water Quality and grant funding policies.

It is the objective of this Supplement to discuss these major actions and their effects on the Master Plan. As a result of these actions, consideration has been given to different staging alternatives for the Master Plan to conform with the new policies and future programs. Finally, this Supplement is intended to provide a basis for developing flexible policies and programs to meet the changing trends of water pollution control.

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I N T R O D U C T I O N

In December, 1967 the San Francisco Bay Regional Water Quality Control Board adopted a resolution requiring the City to submit by August 1971 a Sewerage Master Plan approved by the Board of Supervisors. In mid-September 1971 the Department of Public Works did submit a report to the joint Board of Supervisors' Health and Environment and Finance Committees consisting of three documents entitled "San Francisco Master Plan for Wastewater Management -- Preliminary Comprehensive Report, September 1971;" "Book of Plates" and "Appendix." This report was also widely distributed to agencies and citizens whom the Department believed would be interested in water pollution control problems.

Because of the magnitude of the proposed financial obligation, and because the Master Plan involved the use of 45 acres of City park property to be used for zoo expansion, the Joint Committee directed the Department of Public Works to secure conceptual approval of the Master Plan from both the City Planning Commission and the Park and Recreation Commission. The City Planning Commission approved the basic concepts of the Master Plan in July 1972, and the Recreation and Park Commission approved the Master Plan in principle in December 1972. These approvals are included in the Appendix of this supplement.

The Master Plan defined both short - and long - range conceptual solutions for:

1. Meeting ever increasing wastewater discharge requirements

for the City's three sewage treatment plants during dry weather periods;

2. Providing for the control and treatment of the combined wet weather overflows from the City's 43 outfalls; this would also aid to effectuate control of rainfall run-off and flooding on City streets due to undersized or inadequate sewers.

Lastly, the Master Plan included a recommended method of staged financing of the program, which considered both the priority of needs and the City's financial capabilities.

During the past two years since the Master Plan was presented to the Joint Committee, a number of major actions have taken place which required this supplemental report. These include:

1. Major revisions by Federal, State and Regional water quality requirements and policies.
2. Major changes in the availability of Federal and State grant funds.
3. Retention of the firm of J. B. Gilbert and Associates, Planning and Engineering Consultants who were assisted by Metcalf and Eddy, Inc. to comprehensively review and evaluate the Master Plan. Mr. Gilbert is the former Executive Officer of the State Water Resources Control Board and a past member of the Regional Water Quality Control Board. Metcalf and Eddy, Inc. is a large, long-established sanitary engineering firm with an excellent

inter-national reputation. Many of their suggestions which are detailed in their separate report entitled "Evaluation, San Francisco Waste Water Master Plan" have been incorporated in this supplement.

It is to be stressed, however, that the fundamental concepts of the Supplement to the Master Plan are precisely the same as those set forth in the 1971 version. The concepts include the solution to the wet weather and dry weather pollution and flooding problems which requires combination of wet weather inland and shoreline storage, a single large treatment plant best located at the Lake Merced (south of the zoo) site, and a deep water ocean outfall. These concepts also include the consolidation of outfalls, reduction of the number of treatment plants, and the flexibility for staged future development for attainment of more stringent water quality requirements and water reclamation.

This report entitled "San Francisco Master Plan for Waste Water Management - Preliminary Comprehensive Report, Supplement I - May 15, 1973" is divided into the following sections:

Sec.	Title
I	Summary of Master Plan, September 1971
II	Major Activities 1971-1973
III	Alternates for Revision of Master Plan
IV	Recommended Alternates to Master Plan
V	Future Actions
	Appendix

In the Appendix there is an errata sheet on the 1971 Master Plan correcting clerical and technical errors, and improving statistical data readability.

The contents of the Master Plan - Supplement I has been presented to the staffs of the U. S. Environmental Protection Agency, State Water Resources Control Board and the Regional Water Quality Control Board. It has also been discussed with the prime consultants for the San Francisco Bay Basin Plan, and the General Manager of the Bay Area Sewage Services Agency. The Plan also was presented at meetings with the newly formed Citizens Participation Committee for Wastewater Master Plan.

The next step is that the Board of Supervisors take an action on the proposed Master Plan in order that it can officially be submitted to the Regional Water Quality Control Board. If the Board approves the Plan as is, or with modifications, it will be approving Stage I for implementation and the remainder of the plan in concept only as component parts must be approved by many agencies. However, that approval will allow the City to proceed on a progressive program for compliance of both dry weather and wet weather requirements. If the Board does not take any action or summarily disapproves the Master Plan, the program for completion of needed facilities will be delayed and the City will be in jeopardy of losing Federal and State grants and receiving punitive action from the Regional Board.

SECTION I: SUMMARY OF MASTER PLAN, September 1971

A water quality management Master Plan was presented to the Board of Supervisors on September 15, 1971 which represented a comprehensive program for managing and upgrading the collection, treatment, and disposal of San Francisco's combined sewage and rainfall runoff. This Master Plan was formulated to meet both existing conditions and anticipated future conditions.

San Francisco's sewage system is a combined system which transports and processes both storm runoff and dry weather sewage through a single system of pipes to the treatment plants. Basically, the deficiencies of the existing system can be described as follows:

1) Transport and Collection: Many of the sewer mains are too small to transport the combined sewage and runoff during wet weather and local flooding results. Also many older sewers are in, or are approaching, a state of structural failure.

2) Treatment Capacity: The existing treatment system has only 1/50th of the capacity size of the transport system. During rainstorms above the intensity of a light rain (0.01 to 0.02 inches per hour) the existing treatment plants bypass combined sewage and raw sewage flow without treatment to the receiving waters. Assuming the 0.02 inch per hour capacity the plants presently capture about one third of the runoff and in doing so appear to be performing on a basis equal to or slightly better than an equivalent separate system.

3) Level (Degree) of Treatment. Existing sewage treatment plants (North Point, Southeast, and Richmond - Sunset) presently remove from the influent flow about 65 to 75 percent of the suspended solids, 35 to 50 percent of the BOD and about 99% of the settleable matter. The plants however do not comply with present discharge requirements conforming to the newer and more stringent State and Federal policies.

In developing a solution to these deficiencies, three basic sets of factors were considered.

1. Elements which cannot be controlled or modified are:
   a. Rainfall: amount and time-space variation.
   b. Area tributary to the City's combined sewer system
   c. Land usage
   d. Topography
   e. Receiving water ecosystems
2. Factors considered to be subject to modification by means readily available to the City are:
   a. Sewer system
   b. Treatment Processes
   c. Waste Water Discharge Location
3. Factors relating the receiving water ecosystems to the waste water quality and the discharge location. These were the ecological criteria for the disposal of waste water effluents developed by the City's consultant, Brown and Caldwell. These are more fully elaborated in the Comprehensive Report and in reference 24 to the Comprehensive Report.

Considering the measured data and the above factors, some of the conclusions and recommendations as contained in Chapter II of the Comprehensive Report are as follows:

1. The concept of constructing combined sewers within the City and County of San Francisco should be retained.
2. Control consisting of storage and treatment facilities should be constructed such that no more than 8 overflows will occur in each year.
3. The recommended plan for implementation as described in the Master Plan will best attain the following criteria.
   a. Treatment waste shall be discharged through properly designed offshore outfalls so as to have no adverse effect on the marine ecosystem, the water or beaches.
   b. The available treatment capacity shall be variable over a wide range of rates to meet special flow or available dilution changes.
   c. There will be the flexibility to meet changing water quality requirements and needs for reclaimed waste water and treatment will be based on a "building block" concept to meet these needs.
   d. Valuable land such as in Golden Gate Park and in the north waterfront area will be released from sewage treatment use and replacement facilities, with multi-use potential, would be constructed in more appropriate locations.
   e. Financing of the plan implementation will be feasible and recognize increasing maintenance and operation costs.

f. Cost effectiveness shall be considered to aid in establishing policy on the degree of wet weather control.

g. Immediate upgrading of the effluents from the treatment plants will be undertaken.

h. That substantial reduction in flooding of City streets be obtained.

i. The degradation of receiving waters by combined overflow will be substantially reduced.

j. A viable industrial waste program shall be expedited to control toxic discharges.

k. There shall be long-range capability for the consolidation of the three treatment plants into one plant.

l. Orderly phasing of facilities shall be followed such that facilities need not be prematurely abandoned if it proves necessary to prohibit or restrict discharge into the Bay.

m. There shall be the capability to effectuate an agreement for San Francisco to accept effluent from agencies in northern San Mateo County to facilitate a sub-regional consolidation plan.

n. There will be compatability with the anticipated Bay Area regional sewerage plan.

o. There will be capability of conversion to rail transport of solids (dried sludge), in the event a local or regional rail haul plan for solid waste is implemented.

p. Advantage shall be taken of the City's hilly topography

for underground storm storage.

q. There shall be direction toward a central control system so that dry and wet weather flow can be managed by maintaining and assigning incremental masses of runoff to storage and treatment facilities all within the available transport capacity in response to the demands of temporal and spacial rainfall variations.

4. The City should provide capacity to collect the runoff from all areas within its bounds with appropriate reimbursement to the City for the costs incurred in the collection of runoff from Federal and State lands. Agencies outside of the City's bounds should also be allowed to purchase capacity within the City's system.

5. A program for the collection of all minor outlets on the City's periphery should be initiated. These outlets are mainly on the eastern shoreline of the city and are primarily storm water outlets from minor drainage areas.

6. The wet weather treatment capacity deficit now existent should be alleviated through the construction of a major facility at a site in the vicinity of Lake Merced, a location which allows for sub-regional consolidation with smaller coastal facilities in San Mateo County if cost studies warrant.

7. The capability to develop and provide reclaimed waste water for any use shall be provided in the development of treatment processes.

Following is a brief description of the plan to meet the conclusions and recommendations as presented in the September 1971 Report.

The Master Plan provides for additional wet weather treatment capacity, which, when combined with storage of combined flow, provides a minimum cost control system. The storage facilities are located to reduce flooding, due to undersized sewers.

The key facilities are shown on Plates VI-1 and are described in detail in Chapter XI of the comprehensive report. Briefly, these facilities are as follows:

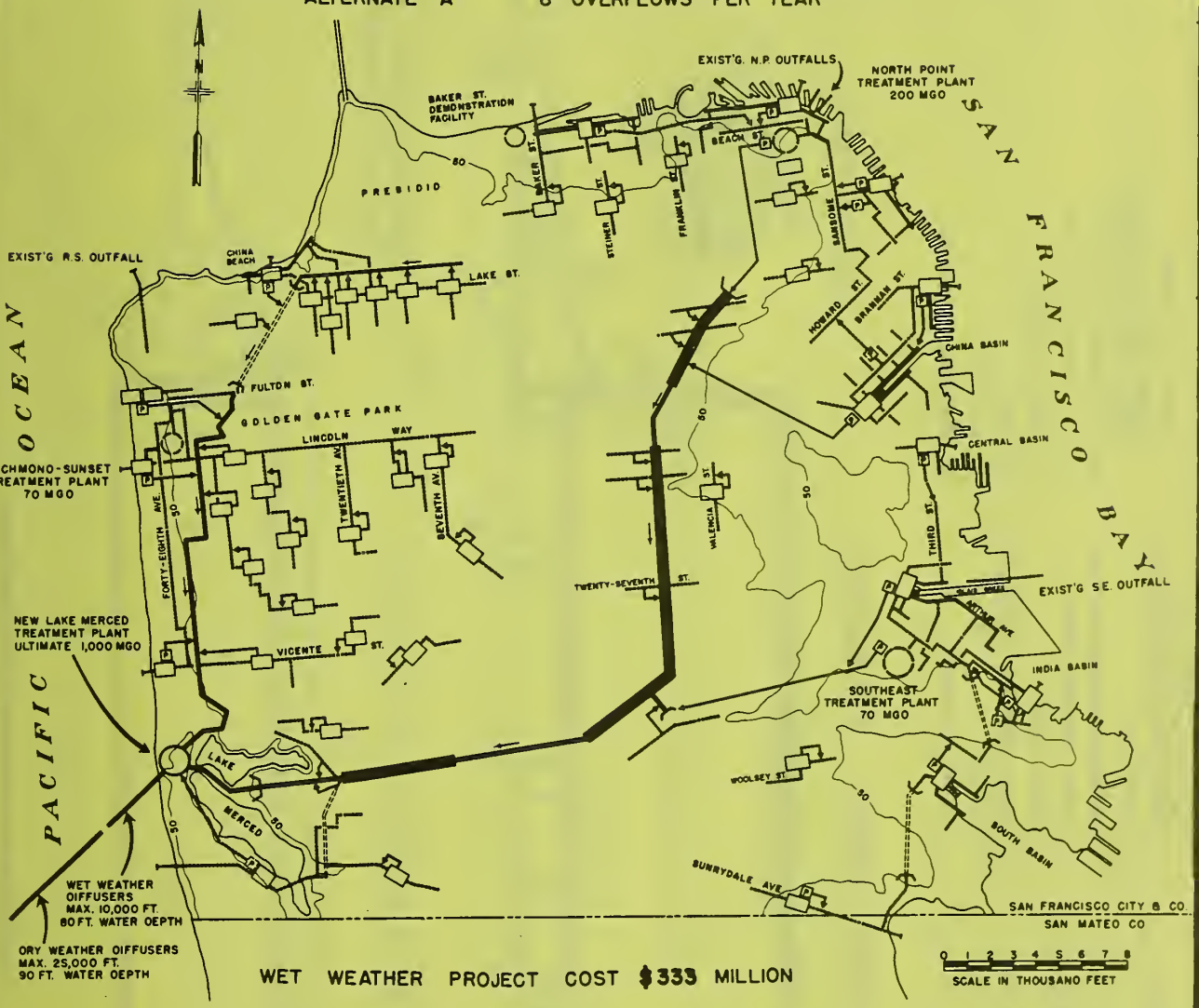
(1) Inland retention basins. Basins will be located under 15 street areas for alternative A storage and will be about 60' in width and will vary from 50 to 150' in length and be about 30' deep. Designed for use in rainy weather, these basins will hold waste water which would then be released at a rate paced to the treatment facilities. These basins will be designed to require infrequent maintenance, produce no odors, be self-cleaning and not present any noise or nuisance problems. Plate VI-10 shows the basin details. Plates VII-3 and VII-4 in the comprehensive report give specific basin details.

(2) Shoreline retention basins. These are at sixteen shoreline locations which will combine and replace the existing forty-one (41) wet weather outfalls. In the early stages, these underground basins would store runoff and sewage which would

PLATE VI-1

MASTER PLAN FOR WET WEATHER CONTROL

ALTERNATE A 8 OVERFLOWS PER YEAR



WET WEATHER PROJECT COST $333 MILLION

	NUMBER OF OVERFLOW LOCATIONS	AVERAGE NUMBER OF OVERFLOWS PER YEAR	DURATION IN HOURS	TOTAL HOURS PER YEAR	VOLUME OF † UNTREATED OVERFLOW DISCHARGE (BILLIONS OF GALLONS)			VOLUME OF † TREATED DISCHARGE (BILLIONS OF GALLONS)			DAYS RECEIVING WATERS EXCEEDS BACTERIAL STANDARDS (PER YEAR)
					OCEAN	BAY	TOTAL	OCEAN	BAY	TOTAL	
EXISTING	43	82	2.5	205	2.0	4.0	6.0	8.2	30.8	38.8	171.0
ALTERNATE A	15	8	2.0	18	0.25	0.5	0.75	44.1	NIL	44.1	40.0-80.0
% REDUCED		90%		92%	87.5%	87.5%	87.5%				53.0-76.5%

	SUSPENDED SOLIDS (MILLIONS OF POUNDS/YEAR)	COD • (MILLIONS OF POUNDS/YEAR)	GREASE • (MILLIONS OF POUNDS/YEAR)	FLOATABLES • (MILLIONS OF POUNDS/YEAR)	NITROGEN • (MILLIONS OF POUNDS/YEAR)	PHOSPHATE • (MILLIONS OF POUNDS/YEAR)
EXISTING	41.7	125.8	10.8	0.47	10.4	4.75
ALTERNATE A	14.3	81.2	3.5	0.33	9.7	1.40
% REDUCED	65.5%	35.5%	68.0%	30.0%	7.0%	70.5%

† GOLDEN GATE BRIDGE-DIVIDING BOUNDARY

• CHEMICAL SEDIMENTATION

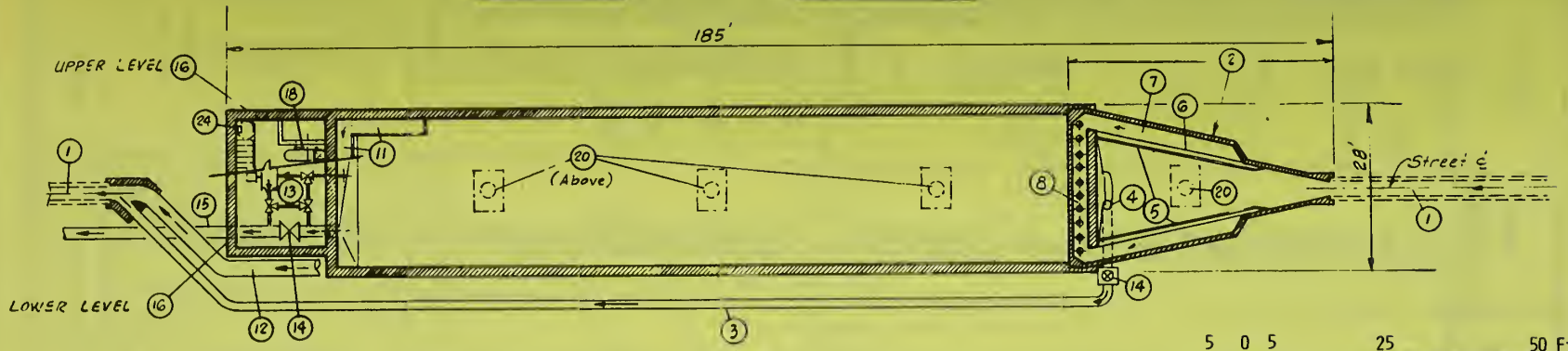
LEGEND

DASHED LINES DENOTE EXIST'G. FACILITIES
SOLID LINES DENOTE NEW FACILITIES

- RETENTION BASIN
- P PUMP STATION
- TREATMENT PLANT
- TUNNEL
- TUNNEL WITH STORAGE SECTION
- FORCE MAIN
- SEWER
- OVERFLOW SITE
- —50— 50 FT. CONTOUR LINE

AUGUST 24, 1971

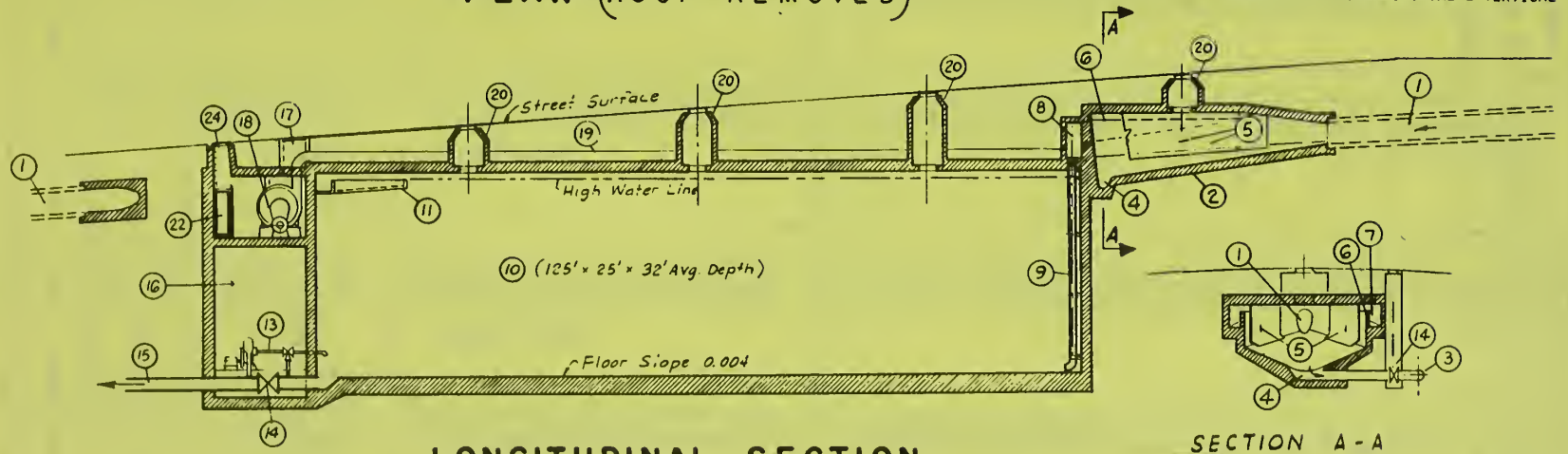
INLAND BASIN



PLAN (ROOF REMOVED)

5 0 5 25 50 Ft.

GRAPHIC SCALE: HORIZONTAL & VERTICAL



LONGITUDINAL SECTION

SECTION A-A

KEY

1. Existing combined sewer (2'-6"x3'-9")
2. Material separation structure.
3. Dry weather sanitary & optional storm flow bypass
4. Drain to bypass-shunts heavy & floatable fractions past storage.
5. Baffles-entraps floatables until after storm.
6. Weir-retains heavy material, passes dilute storm flow to storage.
7. Influent to storage
8. Distribution channel
9. Downcomers
10. Storage compartment (100,000 cu.ft.)
11. Overflow trough
12. Overflow discharge conduit
13. Emergency dewatering pump system
14. Control gate
15. Gravity discharge-reconnects with combined sewer downstream.
16. Underground service area
17. Air intake
18. Fan
19. Forced air conduit
20. H.P. washdown system vault
22. Local automatic & remote control station- controls valves, pumps, ect. receives signals from central control station
24. Station access manhole

PLATE VI-10

PLATE VII-3

MASTER PLAN REQUIRED STORAGE

BASIN #	ACRES CONTROLLED	TREATMENT RATE IN CFS @ 0.10 IN/HR	VOLUME MILLION CUBIC FEET				STAGE NO.
			ALTERNATE A (16%)	ALTERNATE B (29%)	ALTERNATE C (61%)	ALTERNATE D (100%)	
11-1 (PS) (cc)	165	10.9	0.11	0.11	0.24	0.40	7
11-2 (P)	182	12.0	----	0.13	0.27	0.44	7
11-3 (P) (cc)	175	11.6	0.12	0.12	0.26	0.42	7
11-4 (cc)	761	50.2	0.29 (T)	0.53 (T)	1.10 (T)	1.82 (T)	7
11-5 (P)	246	16.2	----	0.17	0.36	0.59	7
12-1 (PS) (cc)	370	24.4	0.14	0.25	0.54	0.88	6
12-2 (cc)	655	43.2	0.25	0.46	0.95	1.57	6
12-3	129	8.5	----	0.10	0.19	0.31	6
12-4	222	14.5	0.10	0.15	0.32	0.53	6
12-5	276	18.2	0.11	0.19	0.40	0.66	6
13-1 (PS) (cc)	770	50.8	0.54	0.54	1.13	1.84	6
13-2 (cc)	186	12.5	0.10	0.13	0.27	0.45	6
13-3	122	8.1	----	0.10	0.18	0.29	6
13-4	126	8.3	----	0.10	0.18	0.30	6
13-5 (cc)	1,012	66.8	0.39	0.70	1.45	2.42	6
13-6	154	10.2	----	0.10	0.23	0.37	6
13-7	101	6.7	0.10	0.10	0.15	0.24	6
13-8	145	9.6	0.10	0.10	0.21	0.35	6
13-9	165	10.9	----	0.12	0.25	0.40	6
13-10	153	10.1	0.11	0.11	0.23	0.37	6
13-11	387	25.5	----	0.27	0.57	0.93	6
14-1 (PS) (cc)	60	4.0	0.14	0.14	0.14	0.14	6
14-2 (P) (cc)	541	35.7	0.21	0.38	0.79	1.30	6
16-1 (PS) (cc)	90	5.9	0.22	0.22	0.22	0.22	4
16-2 (cc)	88	5.8	0.10	0.10	0.13	0.21	4
16-3 (cc)	112	7.4	0.10	0.10	0.16	0.27	4
16-4 (cc)	168	11.1	0.12	0.12	0.24	0.40	4
16-5	748	49.4	----	----	1.09	1.79	4
16-6	456	30.1	----	0.32	0.66	1.09	4
16-7 (cc)	124	8.2	0.10	0.10	0.18	0.30	4
16-8	204	13.5	----	0.14	0.30	0.49	4
RS SUBTOTAL	9,093	600.3	3.45	6.20	13.39	21.79	
21-1 (PS) (cc)	529	34.9	0.20	0.37	0.77	1.27	1
21-2 (P)	109	7.2	0.10	0.10	0.16	0.26	1
21-3 (P)	108	7.1	----	0.10	0.16	0.26	1
21-4 (P)	299	19.7	0.12	0.21	0.44	0.72	1
24-1 (PS) (cc)	405	26.7	0.16	0.28	0.59	0.97	1
24-2 (P)	90	5.9	----	----	0.13	0.22	1
24-3 (P)	102	6.7	----	0.10	0.14	0.24	1
28-1 (PS) (cc)	517	34.1	0.20	0.36	0.76	1.24	1
30-1 (PS) (cc)	262	17.3	0.10	0.18	0.39	0.63	13
37-1 (PS) (cc)	2,463	162.6	0.95	1.71	3.60	5.90	13
37-2 (cc) (P)	161	10.6	0.10	0.10	0.23	0.38	13
37-3 (cc)	303	20.0	0.12 (T)	0.21 (T)	0.45 (T)	0.73 (T)	11
37-4 (cc)	111	7.4	0.10 (T)	0.10 (T)	0.16 (T)	0.27 (T)	11
37-5 (cc)	923	60.9	0.35 (T)	0.63 (T)	1.33 (T)	2.18 (T)	11
37-6 (P)	80	5.3	----	0.11	0.11	0.19	1
37-7 (cc)	330	21.8	0.13 (T)	0.23 (T)	0.48 (T)	0.79 (T)	14
37-8 (cc)	271	17.9	0.10 (T)	0.19 (T)	0.40 (T)	0.65 (T)	14
37-9 (cc)	453	29.9	0.17 (T)	0.32 (T)	0.67 (T)	1.09 (T)	14
NP SUBTOTAL	7,516	496.0	2.90	5.30	10.97	17.99	
40-1 (PS) (cc)	235	15.5	0.10	0.16	0.34	0.56	14
44-1 (PS) (cc)	2,328	153.7	0.87	1.57	3.31	5.42	12
44-2 (cc)	220	14.5	0.10 (T)	0.15 (T)	0.32 (T)	0.53 (T)	12
44-3 (cc)	469	31.0	0.18 (T)	0.32 (T)	0.68 (T)	1.12 (T)	12
44-5 (cc)	2,289	151.1	0.87 (T)	1.59 (T)	3.34 (T)	5.47 (T)	12
48-1 (PS) (cc)	62	4.1	0.10	0.15	0.15	0.15	8
52-1 (PS) (cc)	749	49.4	0.29	0.51	1.10	1.79	8
52-2 (PS)	540	35.6	0.21	0.36	0.79	1.30	8
54-1 (PS) (cc)	774	51.0	0.30	0.54	1.13	1.85	8
SE SUBTOTAL	7,666	505.9	3.02	5.35	11.16	18.19	
TOTALS	24,275	1,602.2	9.37	16.85	35.52	57.97	

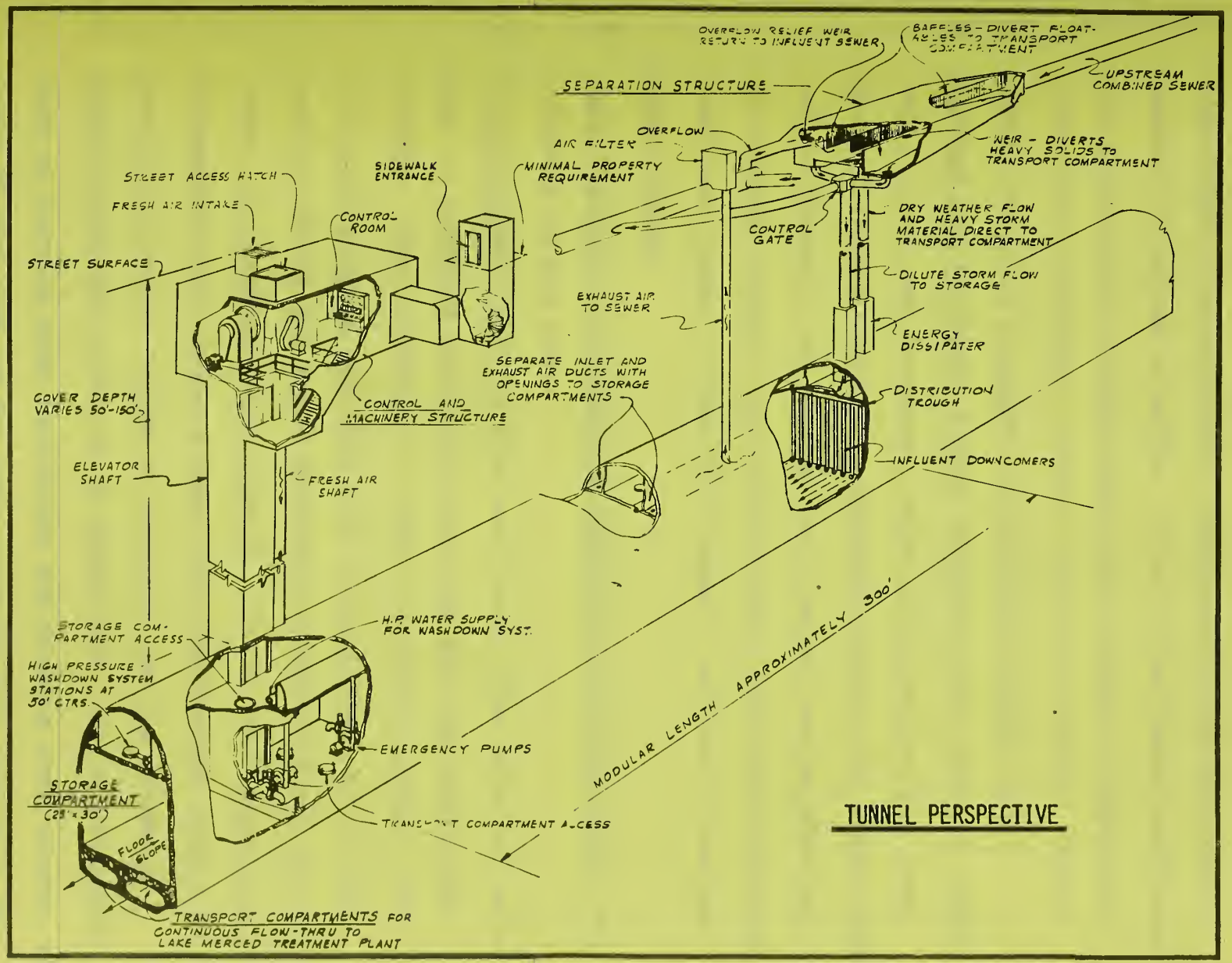
(P) - Pumped (cc) - Control Critical Basin (T) - Tunnel (PS) - Pump Station

RETENTION BASIN DIMENSIONS

BOX. NO.	LOCATION	ALTERNATE A				ALTERNATE B				ALTERNATE C				ALTERNATE D			
		Length (ft)	Width (ft)	Depth (ft)	Volume $ft^3 \times 10^6$	Length (ft)	Width (ft)	Depth (ft)	Volume $ft^3 \times 10^6$	Length (ft)	Width (ft)	Depth (ft)	Volume $ft^3 \times 10^6$	Length (ft)	Width (ft)	Depth (ft)	Volume $ft^3 \times 10^6$
(cc) 11-1 (PS)	John Muir Drive Pump Station	102	60	18	0.11	102	60	18	0.11	222	60	18	0.24	247	90	18	0.40
11-2 (P)	Vidal Drive and Arballo Drive					100	50	26	0.13	139	75	26	0.27	169	100	26	0.44
(cc) 11-3 (P)	Lake Merced Blvd. & Winston Dr.	67	60	30	0.12	67	60	30	0.12	144	60	30	0.26	233	60	30	0.42
11-5 (P)	Brotherhood Way and Thomas More					76	75	30	0.17	160	75	30	0.36	197	100	30	0.59
(cc) 12-1 (PS)	Vicente and Great Highway	94	50	30	0.14	167	50	30	0.25	240	75	30	0.54	294	100	30	0.88
(cc) 12-2	Vicente and Sunset Blvd.	196	75	17	0.25	361	75	17	0.46	373	150	17	0.95	462	200	17	1.57
12-3	Ulloa and 22nd Avenue					52	60	32	0.10	99	60	32	0.19	162	60	32	0.31
12-4	Eucalyptus and Melba	45	75	30	0.10	67	75	30	0.15	143	75	30	0.32	177	100	30	0.53
12-5	Wawona and Ulloa	85	50	26	0.11	146	50	26	0.19	308	50	26	0.40	508	50	26	0.66
(cc) 13-1 (PS)	Lincoln Way and Great Highway	180	100	30	0.54	180	100	30	0.54	252	150	30	1.13	307	200	30	1.84
(cc) 13-2	Lawton and 41st Avenue	70	60	24	0.10	91	60	24	0.13	188	60	24	0.27	313	60	24	0.45
13-3	Pacheco and 35th Avenue					42	60	40	0.10	75	60	40	0.18	121	60	40	0.29
13-4	Santiago and 29th Avenue					53	60	32	0.10	94	60	32	0.18	157	60	32	0.30
(cc) 13-5	Lincoln Way and 39th Avenue	195	100	20	0.39	234	150	20	0.70	363	200	20	1.45	484	250	20	2.42
13-6	Kirkham and 30th					72	50	28	0.10	164	50	28	0.23	264	50	28	0.37
13-7	Noriega and 29th	77	50	26	0.10	77	50	26	0.10	116	50	26	0.15	185	50	26	0.24
13-8	Noriega and 20th	154	25	26	0.10	154	25	26	0.10	162	50	26	0.21	270	50	26	0.35
13-9	Kirkham and 12th Avenue					178	25	27	0.12	186	50	27	0.25	296	50	27	0.40
13-10	Judah and 7th Avenue	69	50	32	0.11	69	50	32	0.11	144	50	32	0.23	232	50	32	0.37
13-11	Clarendon and 7th Avenue					211	40	32	0.27	446	40	32	0.57	470	60	32	0.93
(cc) 14-1 (PS)	Fulton and La Playa	135	60	17	0.14	135	60	17	0.14	135	60	17	0.14	135	60	17	0.14
(cc) 14-2 (P)	Fulton and 48th Avenue	184	60	19	0.21	333	60	19	0.38	346	120	19	0.79	570	120	19	1.30
(cc) 16-1 (PS)	Sea Cliff Outfall	123	60	30	0.22	123	60	30	0.22	123	60	30	0.22	123	60	30	0.22
(cc) 16-2	Lake and 24th Avenue	111	60	15	0.10	111	60	15	0.10	145	60	15	0.13	234	60	15	0.21
(cc) 16-3	Lake and 22nd Avenue	119	60	14	0.10	119	60	14	0.10	191	60	14	0.16	357	60	14	0.27
(cc) 16-4	Lake and 17th Avenue	118	60	17	0.12	118	60	17	0.12	235	60	17	0.24	392	60	17	0.40
16-5	Lake and 14th Avenue									478	120	19	1.09	785	120	19	1.79
16-6	Lake and 8th Avenue					183	50	37	0.32	357	50	37	0.66	590	50	37	1.09
(cc) 16-7	California and 28th Avenue	50	50	40	0.10	50	50	40	0.10	90	50	40	0.18	150	50	40	0.30
16-8	Geary and 23rd Avenue					187	25	30	0.14	200	50	30	0.30	327	50	30	0.49
RS - VOLUME SUBTOTAL					3.16				5.67				12.29				19.97
(cc) 21-1 (PS)	Marina Outfall	111	60	30	0.20	206	60	30	0.37	286	90	30	0.77	353	120	30	1.27
21-2 (P)	Baker and Union	63	50	32	0.10	63	50	32	0.10	100	50	32	0.16	163	50	32	0.26
21-3 (P)	Steiner and Green					49	60	34	0.10	79	60	34	0.16	127	60	34	0.26
21-4 (P)	Lombard and Franklin	80	60	25	0.12	140	60	25	0.21	294	60	25	0.44	474	60	25	0.72
(cc) 24-1 (PS)	Beach Street Outfall	89	60	30	0.16	156	60	30	0.28	219	90	30	0.59	270	120	30	0.97
24-2 (P)	Columbus and Union									62	60	35	0.13	105	60	35	0.22
24-3 (P)	Pacific and Stockton					72	40	35	0.10	100	40	35	0.14	172	40	35	0.24
(cc) 28-1 (PS)	Jackson Street Outfall	96	60	35	0.20	172	60	35	0.36	242	90	35	0.76	296	120	35	1.24
(cc) 30-1 (PS)	Brannan Outfall	67	50	30	0.10	120	50	30	0.18	174	75	30	0.39	210	100	30	0.63
(cc) 37-1 (PS)	Division Street Outfall	302	90	35	0.95	543	90	35	1.71	686	150	35	3.60	937	180	35	5.90
(cc) 37-2 (P)	Valencia and 20th Street	193	20	26	0.10	193	20	26	0.10	221	40	26	0.23	366	40	26	0.38
37-6 (P)	Mason and O'Farrell					58	60	32	0.11	58	60	32	0.11	99	60	32	0.19
NP - VOLUME SUBTOTAL					1.93				3.62				7.48				12.28
(cc) 40-1 (PS)	Mariposa Outfall	111	30	30	0.10	178	30	30	0.16	189	60	30	0.34	312	60	30	0.56
(cc) 44-1 (PS)	Selby Outfall	166	150	35	0.87	300	150	35	1.57	473	200	35	3.31	517	300	35	5.42
(cc) 48-1 (PS)	Evans and Griffith	125	40	20	0.10	188	40	20	0.15	188	40	20	0.15	188	40	20	0.15
(cc) 52-1 (PS)	Yosemite Outfall	97	100	30	0.29	170	100	30	0.51	183	200	30	1.10	299	200	30	1.79
52-2 (PS)	San Bruno and Wayland	135	40	26	0.21	231	40	26	0.36	507	60	26	0.79	835	60	26	1.30
(cc) 54-1 (PS)	Sunnydale and Bayshore	143	60	35	0.30	257	60	35	0.54	360	90	35	1.13	441	120	35	1.85
SE - VOLUME SUBTOTAL					1.87				3.29				6.82				11.07
TOTAL					6.96				12.58				26.59				43.32

(P) - Pumped (PS) - Pump Station (cc) - Control Critical Basin

PLATE VII-4


OVERFLOW RELIEF WEIR RETURN TO INFLUENT SEWER
BAFFLES - DIVERT FLOATABLES TO TRANSPORT COMPARTMENT
SEPARATION STRUCTURE
UPSTREAM COMBINED SEWER
OVERFLOW
AIR FILTER
WEIR - DIVERTS HEAVY SOLIDS TO TRANSPORT COMPARTMENT
STREET ACCESS HATCH
SIDEWALK ENTRANCE
MINIMAL PROPERTY REQUIREMENT
FRESH AIR INTAKE
CONTROL ROOM
CONTROL GATE
DRY WEATHER FLOW AND HEAVY STORM MATERIAL DIRECT TO TRANSPORT COMPARTMENT
STREET SURFACE
DILUTE STORM FLOW TO STORAGE
EXHAUST AIR TO SEWER
ENERGY DISSIPATER
SEPARATE INLET AND EXHAUST AIR DUCTS WITH OPENINGS TO STORAGE COMPARTMENTS
DISTRIBUTION TROUGH
COVER DEPTH VARIES 50'-150'
CONTROL AND MACHINERY STRUCTURE
INFLUENT DOWNCOMERS
ELEVATOR SHAFT
FRESH AIR SHAFT
H.P. WATER SUPPLY FOR WASHDOWN SYST.
STORAGE COMPARTMENT ACCESS
HIGH PRESSURE WASHDOWN SYSTEM STATIONS AT 50' CTRS.
EMERGENCY PUMPS
MODULAR LENGTH APPROXIMATELY 300'
STORAGE COMPARTMENT (25' x 30')
FLOOR SLOPE
TRANSPORT COMPARTMENT ACCESS
TRANSPORT COMPARTMENTS FOR CONTINUOUS FLOW-THRU TO LAKE MERCED TREATMENT PLANT

TUNNEL PERSPECTIVE

PLATE VI-7

be pumped out at a rate paced to the existing treatment facilities. The shoreline basins provide an additional measure of system security. If an inland basin overflows, the waste waters released must pass through a shoreline basin thus providing a second chance at control. These basins would be designed for minimum nuisance also.

(3) Storage and transport tunnel traversing the City to intercept, store, and transport storm drainage from the area above 50-foot elevation to minimize pumping and energy use and, ultimately, to receive the combined wet weather and dry weather sewage flow from the North Point and Southeast treatment plants. Plate VI-7 shows a section of the proposed tunnel.

(4) Pump stations, intercepting conduits, and force mains are included in the plan.

(5) New treatment plant in the Lake Merced area with the capacity of treating one billion gallons per day during wet weather. This location is ideal for Ocean disposal with the least pumping and thus most reliability. It is also near the North San Mateo Sanitation District plant and provides for possible consolidation. The initial phase could accommodate the combined waste from the western sector of the City, thereby making it possible for the Richmond-Sunset treatment plant to be phased out. It is estimated that by burying some facilities and decking over others, at least 65 per cent of the area could be made available for

Zoo use. This plant will provide split flow treatment options such that there will be 1000 MGD capacity for first level treatment of all flow and the capability of providing 250 MGD capacity of second and third level facilities within the land use constraints.

(6) Central automatic computer control of the remote unattended system components provides the basis for management of the combined storm runoff and sanitary flow. System use allocations will be balanced to meet the sensed rainfall demands between storage vacancies available and unencumbered treatment capacity. By reallocating treatment capacities, the central control can effect concentrated total treatment on stressed areas to respond to storm progression across the City. Further, when an overflow situation is imminent, the site of overflow occurrence may be selected to best reduce the environmental impact.

(7) Dual-conduit ocean outfall that would provide maximum ecological protection by: (a) discharging effluent during wet weather which exceeds the dry weather capacity at a distance of approximately 8,000 feet from shore in a surface field, and (b) discharging effluent during dry weather at a distance of 16,000 feet offshore with maximum dilution and a submerged field. Plate VI-25 shows the location.

(8) Inadequate sewers, a program to utilize retention facilities to make the sewers hydraulically adequate.

(9) Replacement of sewers in danger of structural failures.

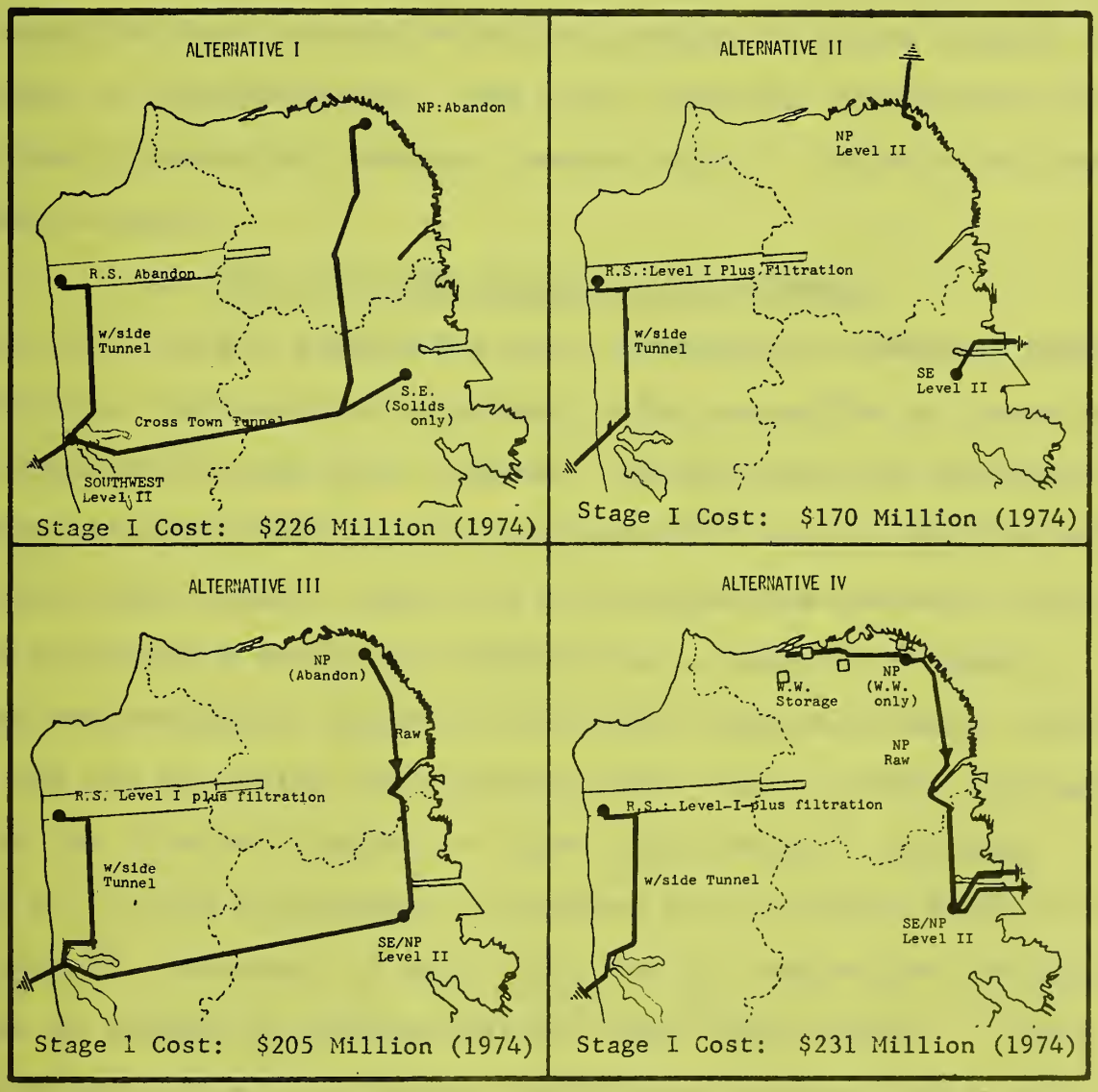
PLATE VI-25

PROPOSED OUTFALL LOCATION
Bonita Channel
FOURFATHOM BANK
PROHIBITED DUMPING GRD
GOLDEN GATE
MAIN SHIP CHANNEL
2000 FEET FOR WIDTH OF
FEET JAN-FEB 1971
11,300' of combined discharge pipe including 1800' of wet weather diffuser
8000'
16000'
8600' Dry Weather Outfall
2000' diffuser
Contour Lines Show Depth in Feet
SCALE: NAUTICAL MILES
0 1 2 3 4
Suitable Waste Disposal Areas
DEPTH OVER 60 FT.
DEPTH 40 TO 60 FT.
SAN FRANCISCO
Presidio
Golden Gate Park
Mt Sutro
San Miguel Hills
Mt Davidson
Daly City
Colma
Pacific Manor
Mussel Rocks
Mile Rocks
Seal Rocks
Yellow Bluff
Lime Pt
Fort Pt
Tennessee Pt
Pt Bonita
Pt Diablo
Angel Island
Sausalito
SAN FRANCISCO BAY

The foregoing factors, conclusions, recommendations, and proposed facilities continue to obtain even in view of the changing regulatory actions at the State and Federal levels. When examining alternatives of size, process and method of disposal now or in the future, the foregoing factors and conclusions must be considered. All alternatives must be evaluated on the same scale to provide a realistic comparision.

PLATE A

MASTER PLAN ALTERNATIVES
FOR
THE FIRST STAGE OF IMPLEMENTATION



COSTS IN MILLIONS OF 1974 DOLLARS

	Alt. I	Alt. II	Alt. III	Alt. IV
1) Stage I Cost: as shown	$226	$170	$205	$231
2) Ultimate Cost: Upgrade Remaining Plants to Level III and Build W.W. Plant and Facilities	$558	$656	$683	$672

SECTION II - MAJOR ACTIVITIES 1971 - 1973

Part A - Major Activities

Since the initial presentation of the Master Plan to the Board of Supervisors in September 1971, several significant actions by outside agencies have occurred which will result in major changes in its order of implementation. The basic concepts of the Master Plan as initially presented, however, remain valid. The major actions referred to are:

1. EPA's 85% BOD Reduction Requirement.

In July 1971 the EPA prescribed, as a condition for Federal grant eligibility, that proposed treatment works accomplish at least an 85% reduction of 5-day BOD. However, the EPA retained authority to waive this requirement for a project which would discharge wastes into open ocean waters. Based on the conclusions derived by the City's consultants Brown and Caldwell Inc., from their oceanographic and ecological study of the Golden Gate and Ocean, the City asked the EPA to define the proposed North Point outfall discharge site in the Alcatraz Channel as "open ocean waters", and that a waiver of the 85% requirement be granted for the North Point outfall project. However, in April 1972 the EPA denied San Francisco's request to define the Central Bay as "open ocean waters". Since the provision of 85% BOD removal facilities at North Point would require what is believed to be an impracticable acquisition of land, the EPA's decision effectively precluded the continued use of the North Point Plant and thereby terminated the outfall project.

2. Federal Water Pollution Control Act Amendments of 1972.

This Act, known as Public Law 92-500, effective October 1972, supersedes many of the EPA's former requirements. The Act prescribes effluent limitations based on secondary treatment for publicly owned treatment works in existence on July 1, 1977 or approved for construction grants prior to June 30, 1974. Although the "secondary treatment" definition is still to be officially adopted, it is as presently written just as stringent as the EPA's former 85% BOD reduction requirement. There is no provision for waiver of this requirement for any receiving waters. Thus, discharges into either San Francisco Bay or the Pacific Ocean will be subject to limitations based on secondary treatment. The Act requires that by 1983 publicly owned treatment works must provide "the best practicable waste treatment technology." The Act further provides for the adoption of effluent limits for pollutants, toxicity standards and industiral pretreatment standards, all to be defined later by the EPA.

The Act also increases the Federal share of construction grants from a maximum of 55% up to 75%.

3. EPA Environmental Impact Statement on Dry Weather Transport System.

Although the State Water Resources Control Board certified $33.5 million as the first phase of the Dry Weather Project, including the North Point transport system and Southeast plant improvements, the EPA did not fully concur. The EPA determined that the $10 million Southeast plant improvements would not significantly affect

the environment and therefore warranted a "negative declaration" and full approval. However, for the $23.5 million North Point transport system, to Southeast Treatment Plant, the EPA decided on December 13, 1972 that it should write an Environmental Impact Statement. The effect of this action is a delay of approximately 1 year for the advertisement of the transport system.

4. Impoundment of Grant Funds.

Although Public Law 92-500 authorized a total of $11 billion in Federal grant funds through June 30, 1974 to provide 75% financial assistance to municipalities in the construction of treatment works, the President has permitted the allotment of only $5 billion for the fiscal year ending June 30, 1974. An additional $7 billion authorized for the fiscal year ending June 30, 1975 has not been acted upon by the President. The cutback in grant funds for 1973 and 1974 is bound to have a serious delaying effect in the construction of municipal treatment works.

5. SWRCB Ocean Waters Control Plan.

The State Water Resources Control Board adopted a Water Quality Control Plan for Ocean Waters of California in July 1972. This plan sets forth stringent water quality objectives and minimum quality requirements for waste discharges into coastal waters. Additionally, the ocean plan established, in general, areas of special biological significance, near which no waste discharges will be permitted. Recently, Seal Rocks and the Farallon Islands have been designated by the Regional Board as areas of special biological significance, thus effectively ruling out the Richmond-Sunset's

present outfall. The ocean plan also prohibits the bypassing of untreated wastes to the ocean.

6. State Priorities for Grant Funds.

Since the Federal construction grant program came into being, California has been administering the program within state boundaries, and has had authority to set priorities for allocation of grant funds. In the past the State has generally determined that separate wet weather projects are too low in priority to be considered for grants, since available Federal funds are and will be insufficient even to cover all dry weather projects. However, it is possible that in the foreseeable future the State may permit future funding of consolidated dry and wet weather facilities, provided that the major emphasis be placed on dry weather control. The State has also modified its funding percentage to 12 1/2%. Thus, combined State and Federal grant funds may reach 87 1/2%.

7. Regional Board Cease and Desist Orders.

In October 1972 the San Francisco Bay Regional Water Quality Control Board adopted Cease and Desist Orders 72-90 and 72-91 directed to the discharges of the North Point and Southeast plants, respectively. In January 1973 the Regional Board issued Cease and Desist Orders 73-1 and 73-2 requiring the City to comply with all dry weather requirements by September 1, 1977. These Orders, copies of which are in the Appendix, contained a definitive time schedule for the construction of facilities, interim chlorination and dechlorination facilities and new diffuser at the North Point Plant, the NP to SE transport systems, expanded primary and second level treatment at

Southeast, and the completion of a bay or ocean outfall. Failure of the City to comply with these Cease and Desist Orders may result in enforcement actions against the City, including new connection restrictions and monetary penalties.

Part B - Other Activities Since 1971

Since 1971, there have been a number of actions by outside agencies which has or will have some impact on the City's planning, although they are not expected to cause major changes in concept or implementation of the Master Plan.

1. Federal Actions

   a) The U. S. Army Corps of Engineers started in 1972 an evaluation of alternatives for land disposal of liquid wastes as part of its study of wastewater management in the San Francisco Bay and Delta area. San Francisco is recommended for ocean disposal of liquid wastes in all but one alternative.

   b) In October 1972, the President signed a bill establishing the Golden Gate National Recreation Area. The intent of the bill is to preserve for public use and enjoyment certain areas of Marin and San Francisco Counties, including Aquatic Park, Fort Mason, the Marina Green, the Presidio, Lincoln Park, Sutro Heights Park, and a quarter-mile wide coastal strip extending along Ocean Beach from Lands End to Fort Funston. The area is to be preserved in its natural setting and protected from development and uses which would destroy its scenic beauty and natural character. Any

structures which the City proposes to build in the area would either be underground or be designed in a manner to change as little as possible the appearance of the surface, except for landscaping.

2. State Actions

a) In November 1970 the electorate of the State approved the issuance of $250 million of bonds, the proceeds of which would be made available to local communities to upgrade municipal water pollution control plants. In December 1972 Assembly Bill No. 740 became law, in some respects duplicating Federal law in regard to discharge requirements, and as previously mentioned, provided that the State pay 12 1/2% of the eligible cost of treatment works. The State, acting also as administrator of Federal grant funds, has begun to certify San Francisco's dry weather program in stages, and has approved both Federal and State funds for portions of the first stage.

b) The legislature created the Bay Area Sewage Services Agency in 1971 to consolidate the Bay Area's fragmented sewerage agencies, and to complement the State and Regional Boards. The organization's function is to plan, coordinate, and if necessary construct sewerage facilities. BASSA has until January 1, 1974 to review and evaluate the sub-regional plans and to establish a regional water quality management plan. However, this plan would have to be amended when the Basin Plan is adopted. BASSA has the authority to require

participation in a regional sewerage system, or, as a last resort, it has authority to finance and carry out construction and operation of facilities. BASSA will also study the potential for wastewater reclamation in the Bay Area.

c) In November 1972 the California electorate approved the establishment of Coastline Conservation Commissions, having the authority to control development within a 1000-yard wide strip along California's entire coastline. It is not anticipated that these commissions will retard or hinder the development of water pollution control facilities.

3. Regional Actions

a) The Regional Board has the authority to issue discharge requirements for both ocean and bay waters. However, since passage of Public Law 92-500, the Board will not set such requirements until the EPA certifies that the State and Regional Boards are the agencies designated to issue discharge permits within California. It is anticipated, however, that the Regional Board will eventually issue discharge requirements for the bay which will be more restrictive than those for the ocean.

b) In conjunction with development of the Basin Plan for the Bay Area, a joint SWRCB, U. S. Bureau of Reclamation and Department of Water Resources study of wastewater reclamation in the Bay and Delta areas is now in progress. This study will evaluate the feasibility of various uses of reclaimed water, including transportation of San Francisco's

effluent to the San Joaquin Valley for irrigation. However, because of the distance involved, and the high salt content of the effluent, this alternative possibly will not prove to be feasible.

4. City Actions

a) As directed by the Board of Supervisors, the Department of Public Works consulted with the City Planning Department and the Park and Recreation Department in regards to the Master Plan. Upon recommendation of the respective departmental staffs, both the City Planning Commission and the Park and Recreation Commission approved the Master Plan in principle in 1972. City Planning recommended that the new Southwest treatment plant be located on the site immediately south of the Zoo, between the Great Highway and Skyline Boulevard, and stressed joint use of the site with the Zoo. They also recommended citizen participation, and further review of individual elements by City Planning staff. Park and Recreation also stressed joint use with the Zoo, such as parking and Zoo improvements above the treatment facilities, and stipulated that changes to the concepts or land requirements would require their further approval.

b) The City annually applies for Federal and State grant funds to aid in the stage construction of its dry weather program. The State has placed the City's staged program on its 5-year Municipal Project List, and has thus far certified the first stage for grant funds. The State has indicated its accept-

ance of the concept of wet weather facilities by placing them on its 5-year Municipal Project List, but insufficient availability of grant funds will probably continue to result in a low priority being assigned to separate wet weather facilities.

c) The City has applied for a demonstration grant for the retention basin facilities of the wet weather program. While the EPA encourages this effort, it has thus far rejected the City's application, due to lack of available funds.

d) As part of the planning effort for the dry weather program, the City is undertaking extensive pilot plant studies on potential treatment processes, and is also engaging in further oceanographic and toxicity investigations. These studies are being done by special consultants under direction of City staff.

e) The City has retained the firm of J. B. Gilbert and Associates assisted by Metcalf and Eddy, Inc., to comprehensively review and evaluate the Master Plan for soundness of its concepts. The consultants are also to develop several alternative plans for implementing the wet weather program in conjunction with the dry weather program.

f) A 28-member Citizens Committee was established by the Board of Supervisors in December 1972 to review the Master Plan. The committee consits of one member each of 12 interested organizations and eight neighborhood organizations, plus eight individuals with expertise in the areas of concern. The committee will provide continuing review of the Master

Plan as it is developed in detail.

SECTION III: ALTERNATIVES FOR REVISION OF MASTER PLAN

General

Under Section I, the 1971 Master Plan concept of inland and shoreline retention basins controlling high intensity runoff was briefly described. The controlled combination of runoff and sewage is to be pumped or diverted through a tunnel and sewer transport system for treatment at a 1,000 MGD physical-chemical treatment plant near Lake Merced, most of which would be underground. The Master Plan envisioned that the plant would be capable of producing as high a quality of effluent as might be required during dry weather periods; and an effluent equivalent to a mixture of chemical primary and the higher level dry weather effluent. The dry weather effluent was to be disposed of through a diffuser system in the Pacific Ocean three miles offshore, near the San Mateo-San Francisco County line and the excess flow during wet weather disposal of one and one half miles offshore.

Section II described the federal, state, regional, and city activities which have occurred since June 1971 that require the implementation of the 1971 Master Plan to be modified to conform to the new and anticipated objectives, policies, and regulations of the various controlling agencies, and with our estimate of the availability of funding.

From the new legislation, regulations, and fund allocations of the last two years, three key factors have emerged:

1. Substantial federal and state financial grants for wet weather control will probably not be available in the next

several years, until the nation's dry weather compliance programs are nearly completed, except for demonstration facilities or special cases such as combined dry-wet weather facilities.

2. The Environmental Protection Agency, the State Water Resources Control Board and the Regional Water Quality Control Board will require that the City schedule the construction of its dry weather facilities in the shortest practicable time. This will not allow a scheduling for construction of wet weather facilities in coordination with the dry weather compliance program. Thus the implementation must be such that the wet weather facilities are integrated at a much later date.
3. A higher quality effluent than that normally produced with a conventional biological secondary treatment plant will be necessary to meet both federal and state requirements for continuous discharges.

In considering various plans which are capable of meeting the objectives, it becomes clear that the timing imposed by Federal and State regulatory agencies and subsequently supported by their funding is the critical factor controlling the final selection of a plan. For instance, if the current deadline for achieving the secondary treatment objective is not significantly extended, the most cost-effective plan would have to be sacrificed to meet that requirement. In general, the orderly development of facilities will depend upon many factors, some of which may be in conflict, and some

of which may change in the future.

However, in order to proceed with the formulation of alternate plans, it is necessary to identify these factors which are known, and to make reasonable assumptions concerning those which are unknown, in order to define the criteria and objectives for the alternate plans. These are discussed more fully later in this section.

From these, it is our conclusion *that the City must proceed immediately with upgrading effluent discharge from its treatment plants during dry weather rather than implement the staging of the long range comprehensive program of the Master Plan.* The City should also proceed with the implementation of those joint facilities proposed in the Master Plan that should logically be constructed during the same period that the dry weather program is implemented. There will, of course, be some facilities constructed that will be abandoned when the Master Plan is completed, although the possibility exists that some of these facilities might be converted for standby use. However given the present legal requirements and funding status, the facilities proposed provide the best approach for compliance within the law. Four basically different alternate plans to implement the first stage of this course of action are presented and evaluated in this report. Plate A depicts these alternatives.

Treatment under all of the alternatives is defined in three levels or steps of succeedingly higher degrees. The first level is chemical primary treatment which typically is resulting in 70% to 80% reductions in suspended matter, 45% to 55% reductions in BOD, and

50% to 60% reductions in grease. The second level is either chemical or biological secondary treatment which will typically remove 85% to 95% of the suspended matter, 75% to 95% of the BOD and 75% to 90% of the grease. The third level of treatment analysis consists of adding filters and activated carbon columns to second level treatment. This will increase all removals into the high 90% range.

ALTERNATIVES FOR FIRST STAGE OF IMPLEMENTATION

In this supplement four alternatives for the first stage of implementation of the Master Plan are presented for evaluation. The report of J. B. Gilbert and Associates also presents and discusses a number of alternatives of proceeding. The alternative selected in this report, number four, is the same as that recommended in the Gilbert report.

Each alternative presented herein presents a basically different approach to first stage implementation within the constraints of present treatment commitments.

Alternative I - A single, new plant first stage wherein all of the existing plants and dry weather outfalls are phased out except for the sludge treatment facilities at the Southeast WPCP. A second level treatment plant is constructed at the Lake Merced site and all of the dry weather flow is transported to the Southeast Water Pollution Control Plant for treatment via the transport portions of the crosstown tunnel proposed in the Master Plan. Disposal will be through a combined ocean outfall. The cost for this first stage is $226 million. The total ultimate cost is $558 million for the

complete dry weather-wet weather plan which includes level three treatment for all dry weather flow and storage to limit wet weather overflows to 16 hours (8 times) per year.

Alternative II - Under this alternative first stage, the North Point and Southeast Treatment Plants are expanded to provide a second level treatment capability, while the Richmond-Sunset Plant provides a first level treatment capability followed by filtration. Deep water outfalls would be constructed at the North Point and the Lake Merced sites with the necessary effluent transport system from the Richmond-Sunset plant to the latter site. This alternate has a first stage cost of $170 million. The ultimate total cost for the complete combined plan providing level three dry weather treatment at the three plants and limiting uncontrolled overflows to 16 hours (8 times) per year is $656 million.

Alternative III - Under this proposal, the North Point plant would be phased out, with the Southeast plant being expanded to treat the re-routed North Point flows. The Southeast plant would be capable of second level treatment of the combined flows. The Richmond-Sunset plant would become a first level plant followed by filtration. The treated dry weather effluent from both the expanded Southeast plant and the Richmond-Sunset plant would be transported and disposed of through a combined ocean outfall at the Lake Merced location. All transport lines and pump stations would be for dry weather flows. The first stage cost of this alternate is $205 million, with an ultimate cost of $683 million for the completed plan with two dry weather plants for third level treatment, first level wet weather treatment and overflows limited to 16 hours (8 times) per year.

Alternative IV - This proposed alternate includes the expansion of the Southeast plant for second level treatment capability as in Alternative III. However, it differs from Alternative III in that the North Point plant is retained for use as a wet weather treatment plant. Additionally, retention basins and transport facilities for the control of combined flow druing wet weather are proposed in the northern area. A new outfall is also proposed at the Southeast site to dispose of the additional treated flow from the North Point area. The Richmond-Sunset plant would be expanded, as described in Alternative II with treated effluent disposed of at the proposed Lake Merced site. This alternate results in a first stage cost of $231 million, with an ultimate cost of $672 million for the completed plan which includes two wet weather plants providing third level treatment for all dry weather flows, first level wet weather treatment and overflows limited to 16 hours (8 times) per year.

The costs of each of the above alternatives is depicted on Plate A with three costs being shown. The first figures are the cost of the first stage. The second set of costs are the costs to expand the dry weather facilities to third level treatment and to build the wet weather treatment and control system. This represents the minimum ultimate cost. This is the maximum ultimate cost envisioned. The details of these costs will be contained in a separate appendix.

Assumptions

At this time there is very little in any of the current activities on a State and Federal level that can be considered "known". The few knowns that do exist are the 1972 Amendments to the Water Quality Control Act, the State Ocean Policy, and Cease and Desist Orders that exist on the North Point and Southeast plants which require compliance with requirements by 1977. Thus we must speculate and assume the outcome of certain basic questions that will influence the City's course of action. These include the following:

A. EPA

1. It is assumed that an effluent BOD requirement of 30 to 45 ppm will be adopted with a minimum removal of 85% required for all new facilities for both bay and ocean.
2. No secondary treatment requirement for wet weather overflows will be enforced in the foreseeable future; and the July 1977 deadline will be extended slightly.
3. EPA will consider funding some wet weather projects, as "special cases" where such projects should logically be constructed in the near future and where there is a demonstrated cost effectiveness. Federal funding will continue in the future at the present level for both dry and wet weather pollution facilities.

B. State Water Resources Control Board

1. Ocean Water Policy
   a. The quality requirements set forth for the physical, chemical and heavy metals requirements will not be enforced for wet weather overflow discharges for the

foreseeable future, but less stringent interim requirements will be prescribed.

b. The requirements will be rigidly enforced for dry weather discharges.

2. Funding

The same policy will be adopted by the State as by the EPA.

C. Regional Water Quality Control Board

1. Discharge Requirements. Effluent requirements for a bay disposal will be somewhat more rigid than those prescribed for an ocean disposal.

2. Preference for Ocean Disposal. The Regional Board will continue their past policy of favoring deep water ocean disposal.

3. Consolidation of Treatment Plants. The Regional Board will continue to favor consolidation of treatment plants.

4. Biologically Significant Areas. Seal Rocks and the Farallon Islands area and will continue to be the only two locations designated as biologically significant areas along San Francisco's ocean coast. Areas within the bay may be included such as the oyster and shellfish beds south of Hunter's Point and Candlestick Cove.

5. Cease and Desist Orders. The Regional Board will amend the schedules set forth in Cease and Desist Orders No. 73-1 and 73-2 in order to permit the City to efficiently incorporate certain joint dry weather-wet weather facilities.

6. The regulatory agencies will accept a phased program for wet weather overflow compliance of water quality standards which

will be based upon cost-effectiveness. The initial costs are based upon an average reduction to 16 hours of overflow per year (8 events per year). This does not preclude higher levels of protection in highly used recreational areas.

D. Basin Plan and BASSA

1. Waste Water Reclamation. Because San Francisco is the most remote source and has the least demand for reclaimed or recycled waste water, substantial reclamation of San Francisco's effluent will not be considered feasible for many years.
2. Subregional Plan. The adopted Master Plan will be accepted as an integral subregional plan of the San Francisco Basin Plan and with the comprehensive planning of BASSA.

E. City

1. Southwest Water Pollution Control Plant. The Board of Supervisors and the voters of San Francisco will approve the multi-use concept of a 1000 MGD plant to be constructed at the Zoo site.
2. Golden Gate Park. No plan involving additional land or acquisition or subsurface treatment use at Golden Gate Park will be allowed.
3. Funding. Federal-State grant aid of 87 1/2% will continue to be available for both dry weather and wet weather.
4. Treatment Processes. For a disposal off the North Point site the treatment necessary at this time is second level. For disposal in the bay at the Southeast site, treatment must be at least second level at this time. For deep

water ocean disposal off the Lake Merced site second level treatment is presently necessary. By 1985 third level treatment will probably be required at all sites.

5. Richmond-Sunset Treatment Processes. Approval can be obtained to construct additional treatment facilities at the existing Richmond-Sunset treatment site provided that the majority of the proposed facilities are underground and that no additional land beyond the treatment plant's fenced boundaries is necessary. However, such facilities will not be sufficient to continuously maintain the assumed BOD removal requirement.
6. Effluent Blend. It is assumed that the high quality (second level or better) effluent from the Southeast could be blended with the lower than second level effluent from the Richmond-Sunset to produce a combined effluent that would consistently meet present State and Federal dry weather requirements for ocean discharge.
7. Source Control. The City's industrial waste source control program will be effectively enforced, and scheduled consistent with federal pre-treatment requirements.

DISCUSSION OF ALTERNATIVE PLANS - STAGE I

The four alternatives proposed were briefly described previously, and are discussed in the following paragraphs. Each has the common primary objective of upgrading the treatment of dry weather first, with the treatment of wet weather subordinate to this objective. All of the alternatives contemplate that, in the ultimate plan, there

will be a Southwest Plant for the wet weather first level treatment; that the Richmond-Sunset Plant will be phased out at that time, and the treatment of that flow will also be accomplished at the Lake Merced site. There will be an ocean discharge with the outfall in the same location, although Alternatives 2 and 4 have provision for Bay discharge if it proves more desirable.

Assuming an ocean discharge under all alternatives the transport line from Richmond-Sunset to Lake Merced will be the same and could be used to intercept some of the wet weather flow and discharge through the outfall to a better point of discharge, either with or without treatment. This will reduce wet weather effects upon the ocean beach.

ALTERNATIVE I

Under this alternative, all the dry weather treatment facilities as well as wet weather treatment, except for sludge handling at the Southeast site, will be concentrated at a single plant at the Southwestern end of the City. The North Point and the Southeast Plant (except for solids handling) will be abandoned. A portion of the Cross Town tunnel will be constructed for transport of dry weather flow.

Several advantages accrue as a result of this alternative. The personnel requirements would be less as a result of a single large facility, and the total annual cost, including amortization of costs and maintenance and operations, would be the least of all alternates. There would be no abandonment of facilities in the later phasing of

the total Plan. Land now occupied by the North Point plant and a portion of that occupied by the Southeast Plant would be available for other uses at the earliest time. If requirements changed in the future, the modification would be accomplished more rapidly since it is a single treatment site. It is the most compatable alternative with the ultimate Master Plan.

Several disadvantages, however, would result under this alternative. The installation and operation of secondary, and possibly tertiary treatment in the Southwesterly area especially since it is to be used for zoo expansion, would evoke public objection, since a high degree of treatment is subject to some upset, and since the full-time operation, throughout summer as well as winter with trucking activity, etc., would be highly undesirable. Concern would be expressed that noise and odors might have an adverse effect upon the animals. The total time for construction would be very long and in addition the probability of long delay due to action of Congress in releasing land now owned by the Department of Defense, and the necessity of approval by the electorate, since it is under Recreation and Park jurisdiction. In addition, the construction of the long tunnel is subject to delays. Thus, it is believed it will take a substantially longer period of time under this alternate than the other alternatives before higher levels of treatment for dry weather flow are achieved.

This plan is undesirable as it does not present a high cost-effectiveness during the early stages. Except in the Richmond-Sunset area, there would be no improvement of the combined flow effluent during

wet weather. It requires the abandonment of existing facilities which still have a useful life upon completion of the 1st stage of construction. A larger force main, as well as a duplicate line, would be required to transport sludge from the new facility to the Southeast Plant for solids handling.

The location of the Southwest Plant is the most unfavorable site for future water reclamation transport.

This alternative commits the City to an ocean discharge immediately while there is still controversy regarding this matter among the citizenry and conservation groups.

ALTERNATIVE II

Under this alternative the existing plants other than Richmond-Sunset will be retained. The Richmond-Sunset plant will be phased out and incorporated in the Southwest wet weather plant.

This plan has certain advantages. This is the least capital cost for the first stage of all the alternatives considered. This involves the least initial investment in non-treatment facilities such as outfalls and construction of new facilities to replace existing facilities, and concentrates the majority of funds in upgrading of treatment processes. The new outfall for the North Point Plant to be located in the Alcatraz Channel is already designed and most of the approvals have been secured. Hence it can be constructed at an early date. The additional facility and land acquistion required at Southeast Plant would be in keeping with the character of the area and much of the land required is vacant. The final decision of Bay

vs. Ocean discharge may be delayed until more is known of the effects under this Plan as compared to several of the other Alternatives.

There are many disadvantages to this alternative. All three treatment plants would be retained indefinitely and thus would not be available for the better uses to which they could be placed. The North Point Plant would require an additional 14 acres in the Northern Waterfront area. Although much of it could be underground, it is not a desirable land use. Part of this needed area could be provided by constructing large facilities in the Bay, which would have obvious serious objections. The location of the North Point Plant hampers the possible reclamation of the large dry weather flow from that plant, as it is farther from areas of possible use of reclaimed water and high quality effluent is at three different sites.

Personnel costs to operate all three plants would be higher than under the other alternatives. It would require an additional sludge line between North Point and Southeast.

There is the difficulty of meeting requirements of Southeast effluent by continuing to operate Southeast as a 20 MGD dry weather flow plant, with an 80 MGD solids handling plant, resulting in an undesirable ratio of sludge to effluent treated. This has been a continuing problem in the present plant operation.

ALTERNATIVE III

Under this alternative, the North Point Plant will be abondoned, the flow from the North Point Plant as well as Southeast treated to required levels at the Southeast Plant and transported to the ocean

site. The Richmond-Sunset Plant (for Stage 1) will be retained and an ocean outfall will be constructed for all flows.

There are several advantages to this plan. The North Point Plant is abandoned at an early stage and the land can be used for higher purposes. There are personnel savings by the consolidation of two large plants. The ratio of effluent to sludge at the Southeast Plant is proper. The location of the major dry weather flow is suitable for reclamation. Vacant land is available at the Southeast site for necessary expansion, and the plant is compatible with land uses. Bay discharges are eliminated. The investment at Southeast and Richmond-Sunset Plants are retained. The sludge line between Northpoint and Southeast, which is undesirable, and must be replaced, can be abandoned. This plant provides for the concept of blending of effluents in Stage 1, allowing better realiability of effluent quality.

This plan also has many disadvantages. Due to the construction of the transport line from the Southeast to the ocean, later to probably being abandoned, there is more disruption in Stage 1 than the other plans, and the short duration of an expensive facility. This plan commits to Ocean disposal at an early point in time, possibly before all the facts involved in a Bay vs. Ocean site have been reconciled by the regulating agencies. The time for obtaining approvals and the time of construction of the full ocean disposal line, necessary for dry weather discharges, is long and may delay the operative date of this plan. The ultimate plan, using this alternate as the first stage, has the highest capital cost.

ALTERNATIVE IV

This alternative is similar to Alternative 3 except that the Southeast Plant discharges to the Bay for Stage 1, and the North Point Plant is used as a wet weather plant when construction at Southeast is completed. Inland and shoreline basins at the Aquatic Park, Marina and the Northerly pier area would be constructed for wet weather control under the first stage.

This alternative has many advantages. It has the best chance of meeting the stringent dry weather time schedule, with the least possibility of delay of completion. This plan allows for the early treatment of wet weather flows in the northeasterly portion of the City which, because of Aquatic Park and the Marina area, is the most highly used beach area in winter. The Baker Street Dissolved Air Flotation Facility would be tied into the Pierce - Laguna retention basin.

The decision as to Bay vs. Ocean discharge and the Southwest wet weather plant site are not required until a later phase. This will allow additional scientific knowledge regarding the Bay vs. Ocean discharges for the major portion of the dry weather flow to be available to the regulatory bodies and the City upon which to base a better decision. Also the final decision regarding the Lake Merced site can await citizen imput and evaluation without delay to any part of the project.

This plan provides the highest cost-effectiveness for Stage I, although not for the ultimate plan. This plan continues a Bay

discharge for a longer time than Alternates 1 and 3. Also we are diverting the North Point effluent from a good disposal location to a poorer one.

SECTION IV: RECOMMENDED ALTERNATES TO MASTER PLAN

The previous section presented a description and discussion of the four alternative first stages for implementing the proposed Master Plan.

As stated previously, the end results of the first stage alternatives are not the same when considering the mass emissions to the bay and ocean from each alternative.

Selection of Alternate IV

Evaluating the four alternates above requires assessing the total advantages of each alternate against their disadvantages.

Although Alternate I is the least expensive ultimate cost and most compatible with the ultimate Master Plan, it is not recommended because of the overwhelming disadvantage and unlikelihood of obtaining the approvals for constructing a second level treatment plant at Lake Merced in short time period. It is expected that before the complete approval is received from all interested agencies on all component elements a great deal of investigating work enabling all environmental consideration must be developed, submitted, reassessed and resubmitted. Any work must be coordinated with a Zoo Master Plan, which has not yet been started.

It is conceivable that concerns will be expressed about the odor and noise effects to animals, the movement of trucking to the plant, the configuration changes to the plant site, the impact to surrounding neighborhood, and the disposal of the sewage effluent regardless

of degree of treatment to the ocean. In addition securing approval of the federal government for the property acquisition, obtaining the electorates approval by Charter Amendment for joint recreational and treatment plant use of the property could take considerable time. It is also likely that the Coastal Commission will conduct extensive hearings before granting its approval.

Finally, unlike the other alternates, Alternate I requires extensive tunnelling. This type of work is not easily divided into small contracts which can be prosecuted concurrently with the possibility of delay in completion.

All of the above mentioned concerns can be satisfactorily resolved technically. However, where time for completion is the major criteria, Alternate I is not acceptable.

Alternate II has the least Stage I cost and indirectly places the emphasis on treatment plant improvements rather than the transport facilities. It in a sense is the easiest, technical and construction-wise to implement. The Richmond-Sunset effluent outfall would be part of the wet weather ocean outfall in any alternate. However, this alternate cannot be recommended because it addresses itself only to the problem of water pollution control at the sacrifice of what is best from the standpoint of the City's land use and long range planning.

The construction of a second level treatment plant, requiring 14 acres of prime land in the North Water Front Area, would have too adverse an impact to that area. Even considering that a major

portion of the structures could be below ground or in the pier area such facility could hamper a more desirable development. Use of the pier area would be in effect a bay fill and this is undesirable.

Just as important an objection to this alternate is the possibility of (as has been proposed in the past) a prohibition of any pollutants or toxic material discharge into the bay, the effluent from the North Point Plant would have to be diverted to the ocean and the cost of the North Point outfall would be wasted. The continuation of the present practice of operating three treatments rather than only two under Alternates III and IV results in a higher ad volorem budget and tax rate subsidy for operation and maintenance.

Finally, the intangible disadvantage, which jeopardizes compliance of water quality of continuing to Southeast operate as a 20 MGD treatment plant effluent and a 80 MGD sludge plant (North Point and Southeast) results in an undesirable balance of sludge to effluent treated that causes many problems. For those reasons, this alternate was not recommended.

Alternate III has the major advantage on Alternates I and II of consolidation of 80% of the City's raw sewage in one expanded second level plant at Southeast. However, the feature of this alternate, concurrently constructing the facilities to transport that effluent directly to the deep ocean waters eliminates any consideration of a bay disposal assuming that the quality of effluent from the Southeast Plant would comply with bay discharge requirements. Thus, it

is conceivable that $33.5 million for Southeast to Lake Merced transport could have been saved by either a bay discharge or waiting for the completion of that element of the Master Plan. Also a major disadvantage of Alternate III is that of time for approvals and construction to I for a large quantity ocean disposal. Alternate III has really no important advantages when compared to Alternate IV.

Alternate IV is recommended because it offers the best possibility of complying with prescribed time schedules due to having the least possibility of its implementation of being delayed by approvals, or technical problems. It maintains the greatest flexibility for decision making at times where irreversible actions have not taken place. And lastly, it integrates the first step for wet weather control at the earliest time without wasted effort on facilities in a logical staged program. All points being considered, it is the recommended alternate.

Staging of Alternative IV

Stage "I", includes facilities that would enable the City to produce the quality of effluent during dry weather that would, for the combined Southeast-North Point Plants, meet the anticipated EPA definition of secondary treatment, the Regional Board's requirement prescribed in the Cease and Desist Orders, and the State's Ocean Policy for both physical constituents and heavy metals. The effluent from the Richmond-Sunset Plant would be greatly improved and would meet existing Regional Board requirements, and may meet the State's Ocean Policy, but would not fully meet the EPA's anticipated secondary treatment until the completion of later stages.

Wet Weather overflows from the Marina-Aquatic Park, Fisherman's Wharf area would be virtually eliminated, and a major portion of the overflow from the Lincoln and Vicente outfalls would be diverted from the beaches and shoreline surf to deep ocean waters. Assuming availability of federal and state funding of 87 1/2%, Stage I is attainable, can be financed with present City Bond issues, and would be considered a firm plan for implementation of the conceptual Master Plan.

Stages II, III and IV are briefly described later in this section and are the next logical successive steps of evolution as can be presently evaluated towards the completion of the Master Plan.

Benefits

Earlier in the report, the subjective benefits of Alternative IV were discussed. These included during dry weather periods, a high quality effluent from the treatment plants that would meet or exceed prescribed requirements; during wet weather the elimination of pollutant discharge from 8 outfalls that directly affect the most important recreational beaches and northern waterfront area of the City.

In order to quantify the removal of pollutants during dry and wet weather, it is necessary to define what the final process for treatment at both the combined Southeast-(North Point) and the Richmond-Sunset will be. These processes will not finally be selected until the completion in March 1974, of the ongoing pilot plant study and the regulatory agencies prescribed discharge requirements. The pilot plant study is analyzing the presence of

over 100 constituents in raw sewage and will evaluate the removal efficiencies of significant constituents for 5 basic process trains.

Financing and Scheduling

The Regional Board's Cease and Desist Order and the Federal Pollution Act both stipulate that secondary or (second level) treatment facilities be completed by July 1, 1977. The total cost of Stage I, $231 million, is proportioned to $160 million and $71 million for dry and wet weather control respectively.

The breakdown cost of the projects in Stage I are shown on the next page.

Proj. No.	Project	Project Cost (Mill. $)
1)	SEWPCP Solids Handling Projects	10.0
2)	RSWPCP Interim Improvements	0.2
3)	SEWPCP & NPWPCP Interim Projects	1.4
4)	Pilot Plant & Toxicity Studies	1.7
5)	Transport System (NPWPCP Flow to SEWPCP)	23.5
6)	SEWPCP Primary Expansion Facilities (For Combined NP & SE Flows)	24.7
7)	Level II Facilities for SE Flow	18.0
8)	Level II Facilities for NP Flow	36.0
9)	RSWPCP Level I plus Filtration	13.0
10)	SEWPCP Interim Outfall (Bay Discharge)	7.0
11)	LM Ocean Outfall (2 mile outfall)	30.0
12)	Transport System (RSWPCP Flow to LM)	24.0
13)	North Shore Wet Weather Treatment & Transport (Retention Basins in N. Shore & Transport to NP & SE)	41.0
		$230.5
	Say	$231

As stated, because the City's share of the total project cost is available, the City could theoretically under the most optimistic view, complete all dry weather projects necessary to comply with the regulatory agencies by July 1, 1977 date. These projects

are shown on Plate B as "Time Schedule A". However, although the City will attempt to comply, there are likely probabilities why the completion of projects will be later than the July 1, 1977 date. These are:

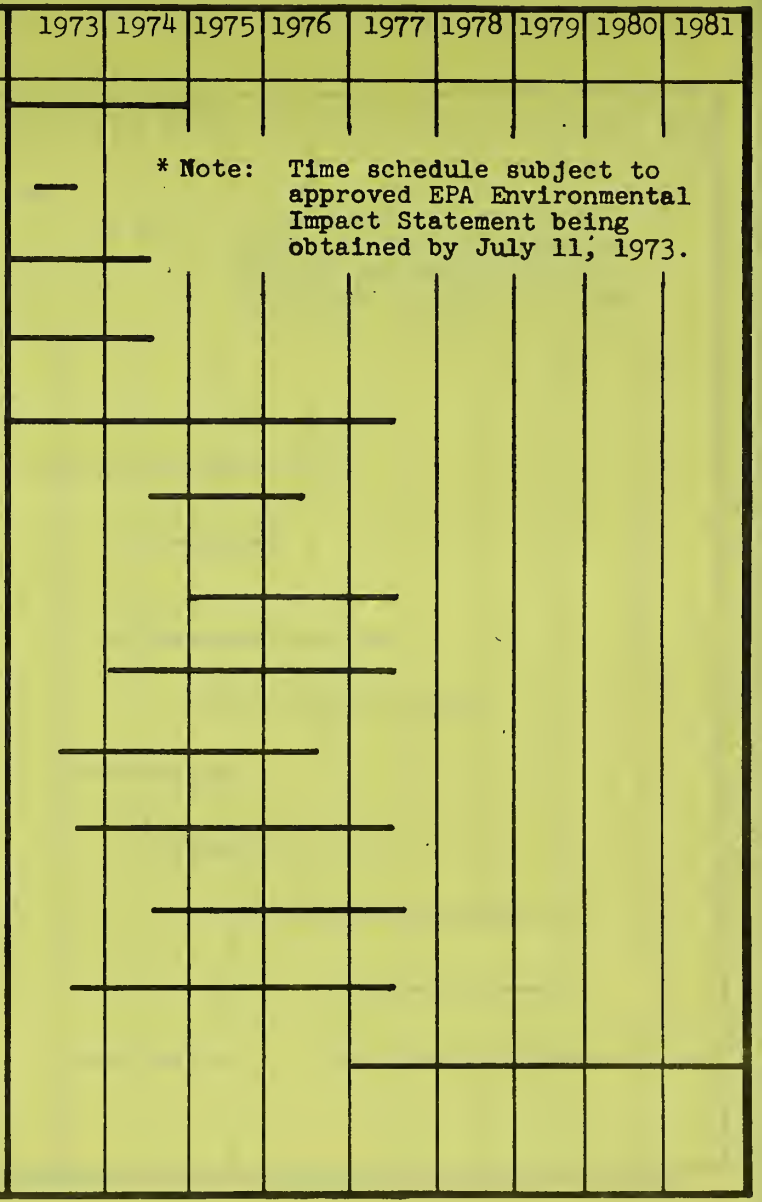
1. The time required for designing the facilities, acquisition of rights of ways, availability of equipment, and construction time, will be greater than those indicated on the schedule.
2. Obtaining approval of federal, stage, regional agencies, local authorities, acceptable Environmental Impact Statements and Environmental Impact Reports, and citizens participation groups.
3. The required Federal and State funds are not available in accordance with cash flow needs of Schedule "A".

Considering all of the above probabilities the construction for the $231 million facility could take up to 10 years. A time schedule for the 10 year completion is shown on Plate C as "Time Schedule B". This scheduling under time schedule "B" would delay compliance of secondary treatment for all plants during dry weather until January 1980, but would greatly reduce the average yearly cash flow. A comparison of the completion dates of the projects of Stage I versus cash flow is shown on Plate "D".

A decision on which schedule to follow is not necessary for either the adoption of the Master Plan or for any action by the City at this time. The City should continue with its efforts to get the facilities completed as soon as possible. If any of the reasons indicated above which would delay the completion of the facilities do materialize, then the scheduling could be adjusted accordingly.

TIME SCHEDULE A

Proj. No.	Project	Project Cost (Mill. $)	Est. ompl. Date
1)	SEWPCP Solids Handling Projects	10.0	1/75
2)	RSWPCP 'Interim' Improvements	0.2	10/73
3)	SEWPCP & NPWPCP Interim Projects	1.4	6/74
4)	Pilot Plant & Toxicity Studies	1.7	6/74
5) *	Transport System (NPWPCP Flow To SEWPCP)	23.5	6/77
6) *	SEWPCP Primary Expansion Facilities (For Combined NP & SE Flows	24.7	6/76
7) *	Level II Facilities For SE Flow	18	6/77
8) *	Level II Facilities For NP Flow	36	6/77
9) *	RSWPCP Level I Plus Filtration	13	6/76
10) *	SEWPCP Interim Outfall Bay Discharge	7.0	9/77
11)	LM Ocean Outfall (2 Mile Outfall	30.0	9/77
12)	Transport System (RSWPCP Flow to LM)	24.0	9/77
13)	North Shore Wet Weather Treatment & Transport (Retention basins in N shore & Transport to NP & SE	41.0	12/81

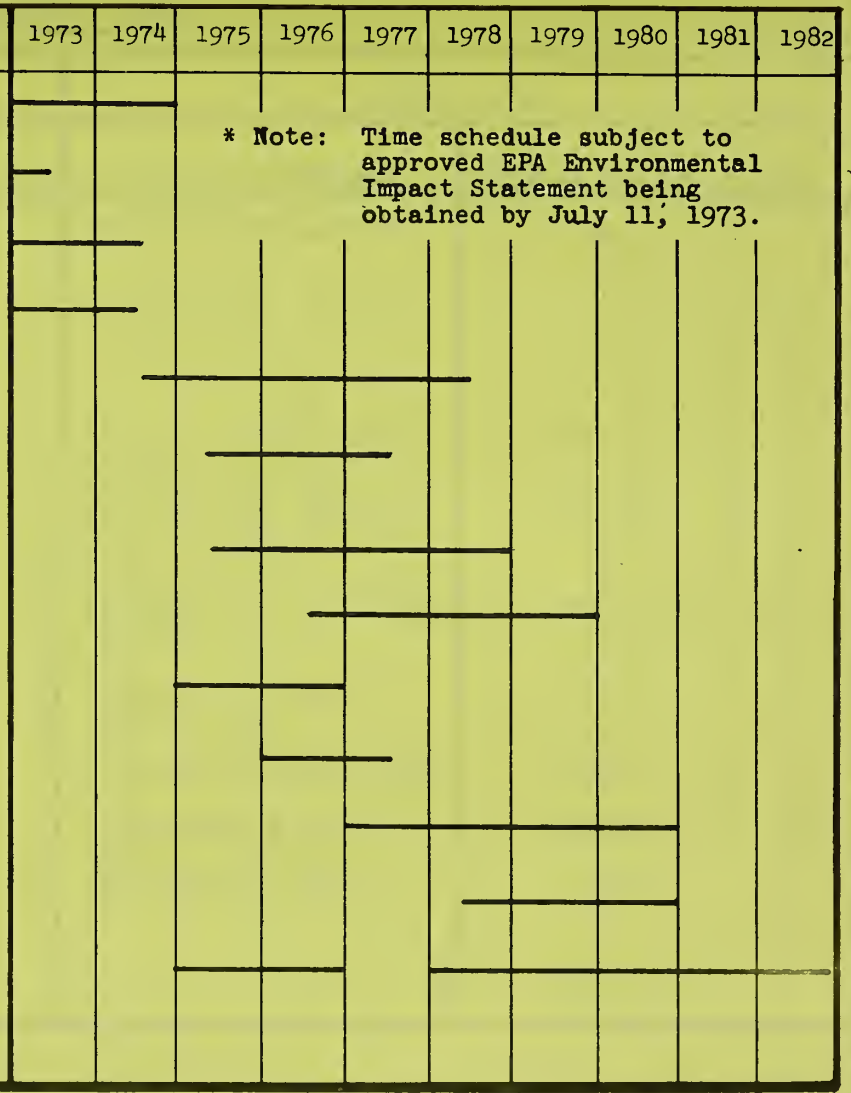


* Note: Time schedule subject to approved EPA Environmental Impact Statement being obtained by July 11, 1973.

PLATE B

TIME SCHEDULE B

Proj. No.	Project	Project Cost (Mill. $)	Est. Compl. Date
1)	SEWPCP Solids Handling Projects	10.0	1/76
2)	RSWPCP Interim Improvements	0.2	10/73
3)	SEWPCP & NPWPCP Interim Projects	1.4	6/74
4)	Pilot Plant & Toxicity Studies	1.7	6/74
5) *	Transport System (NPWPCP Flow To SEWPCP)	23.5	6/78
6) *	SEWPCP Primary Expansion Facilities (For Combined NP & SE Flows)	24.7	6/77
7) *	Level II Facilities For SE Flow	18	1/79
8) *	Level II Facilities For NP Flow	36	1/80
9) *	RSWPCP Level I Plus Filtration	13	1/77
10) *	SEWPCP Interim Outfall Bay Discharge	7.0	9/77
11)	LM Ocean Outfall (2 Mile Outfall)	30.0	1/81
12)	Transport System (RSWPCP Flow to LM)	24.0	1/81
13)	North Shore Wet Weather Treatment & Transport (Retention basins in N shore & Transport to NP & SE	41.0	1/83



* Note: Time schedule subject to approved EPA Environmental Impact Statement being obtained by July 11, 1973.

PLATE C

Cash Flow

Schedule Comparison Sheet

Calendar Year	Schedule A		Schedule B	
	Project Underway	Cash Flow (Mill. $)	Project Underway	Cash Flow (Mill. $)
1973-1974	(1),(2),(3),(4),(5) (9),(10) & (12)	16.7	(1),(2),(3) & (4)	5.5
1974-1975	(1),(2),(3),(4),(5) (6),(8),(9),(10),(11) (12)	44.5	(1),(3),(4) & (5)	7.0
1975-1976	(5),(6),(7),(8),(9) (10),(11) & (12)	58.0	(1),(5),(6),(7),(9) & (13)	30.0
1976-1977	(5),(6),(7),(8),(9) (10),(11) & (12)	48.9	(5),(6),(7),(8),(9) (10) & (13)	44.8
1977-1978	(5),(7),(8),(10), (11),(12) & (13)	29.4	(5),(6),(7),(8),(10) & (11)	37.7
1978-1979	(9) & (13)	8.0	(5),(7),(8),(11), (12) & (13)	35.5
1979-1980	(9) & (13)	8.0	(8),(11),(12) & (13)	34.5
1980-1981	(9) & (13)	9.0	(11),(12) & (13)	23.5
1981-1982	(10) & (13)	8.0	(11),(12) & (13)	6.0
		230.5		230.5

PLATE D

Stage II

Stage II facilities include the remainder of the west side tunnel and all remaining shoreline retention basins together with the upstream west side basins. With the completion of this stage all of the City's shoreline will be afforded a measure of protection. Stage II has a cost of $149 million.

Stage III

Stage III facilities include the construction of the crosstown transport facilities with the storage for the west side areas and the Southwest Water Pollution Control Plant for 1000 MGD of Wet Weather first level treatment. This will result in further reductions of overflows and provide for a treated Wet Weather discharge to the ocean. Stage III will cost $161 million.

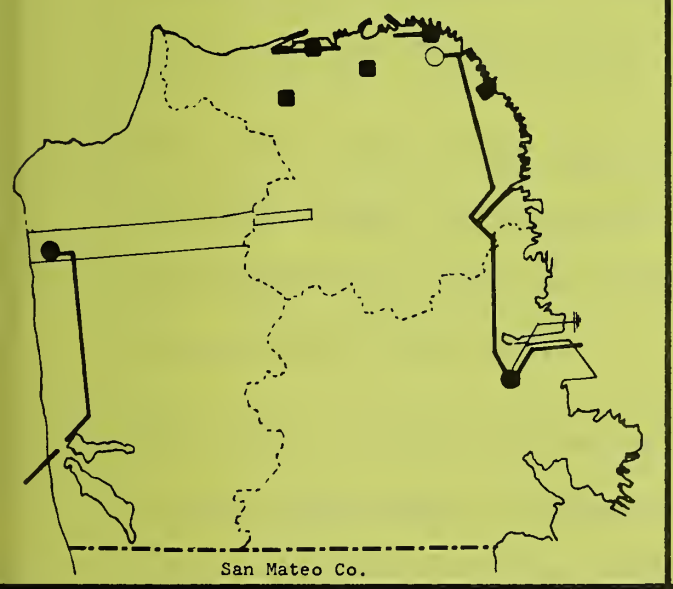
Stage IV

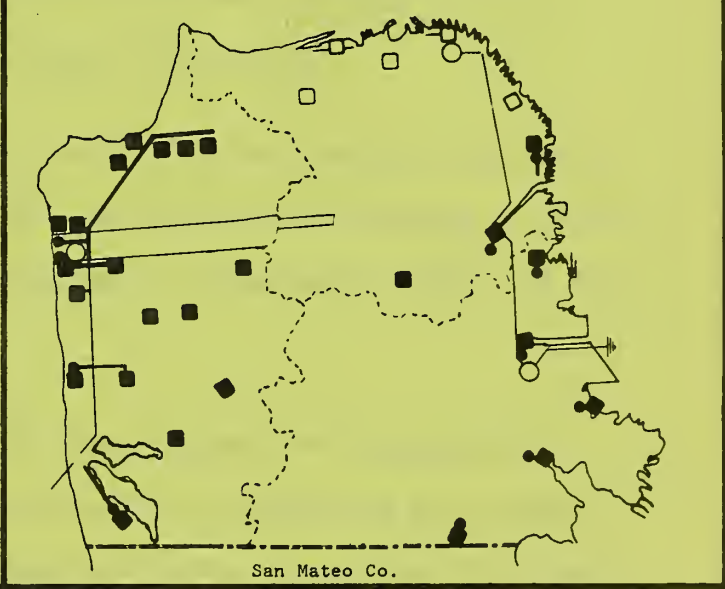
Stage IV represents the final phase of construction presently contemplated. This includes the remaining upstream storage, the extension section of the ocean outfall and the cost of upgrading the facilities at Lake Merced to third level to allow consolidation if desired. This stage costs $131 million.

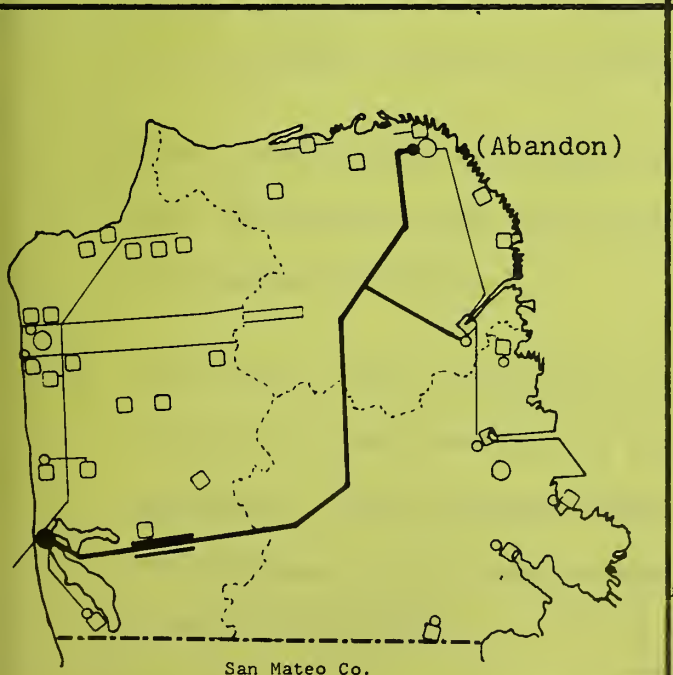
Plate E illustrates each of the stages.

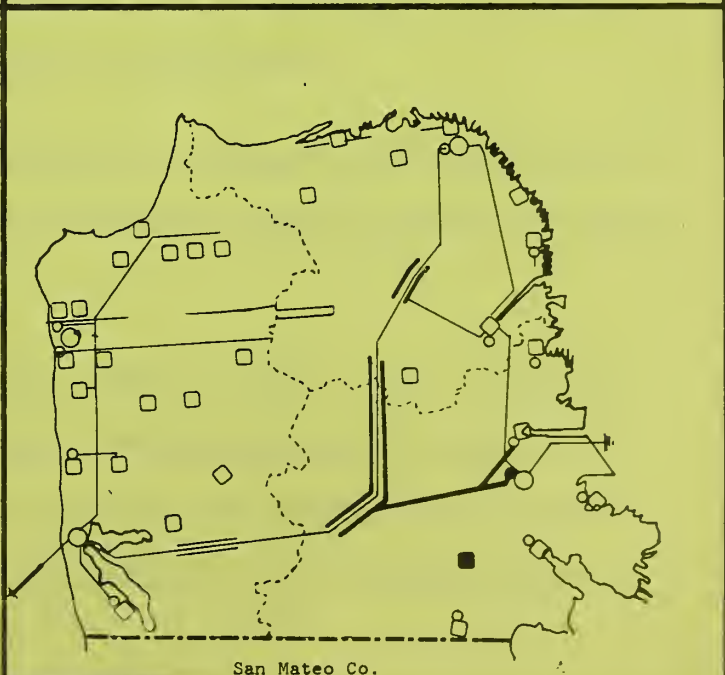
PLATE E

ALTERNATIVE IV
LEVEL A STORAGE
SPACING PROGRAM









SECTION V: FUTURE ACTIONS

In order that the City follows a complete and coordinated course of action, the following actions are recommended:

1. The Board of Supervisors should, by resolution, modify or approve the submitted Master Plan and Supplement for transmittal to the Regional Board at its August 1973 meeting.

2. The City should proceed with the design of all elements of Stage I of Alternate 4 immediately after receipt of an approved EPA Environmental Impact Statement.

3. The City should seek approval of all governmental agencies on all stages of Alternate IV, including initiating a ballot initiative for the use of locating a treatment plant at the Lake Merced Zoo site.

4. The City should continue with an accelerated industrial waste enforcement program, including initiating any necessary amendments to the Industrial Waste Ordinance in order to maximize control of industrial pollutants.

5. The City should initiate construction grant applications for all wet weather projects with immediate application for those projects in Stage I.

6. The City should include in its annual budget, the necessary funds for implementing a proper maintenance and operation program. This program shall include all items necessary for compliance of EPA and state guidelines, or to conform with grant conditions.

APPENDIX
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G - LIST OF SUPPLEMENTARY REPORTS TO SAN FRANCISCO MASTER PLAN COMPREHENSIVE REPORT

CHRONOLOGY OF MASTER PLAN DEVELOPMENT

January 19, 1967 - Regional Water Quality Control Board adopts Resolution No. 67-2 prescribing requirements for wet and dry weather discharges from the Richmond-Sunset Plant and Zone.

December 21, 1967 - RWQCB adopts Resolution No. 67-64 calling for the San Francisco Board of Supervisors to adopt a sewerage Master Plan by June 1, 1971.

February 2, 1968 - S.F. Board of Supervisors adopted Resolution number 68-68 approving RWQCB Resolution No. 67-64.

October 28, 1968 - S.F. Board of Supervisors Resolution No. 716-68 declared intents to comply with RWQCB requirements in accordance with the following schedule:

1. Dry weather requirements on or about July 1, 1975.

2. Wet weather requirements for those Bay and Ocean waters westerly of Pier 45, on or about July 1, 1981.

3. Appropriate wet weather requirements for those Bay waters easterly of Pier 45 which are mutually agreed to be water contact sports area at dates to be established.

October 30, 1968 - RWQCB acknowledges S.F. Resolution 716-68.

January 29, 1970 - RWQCB Resolutions No. 70-2 and 70-3 prescribing discharge requirements for wet weather discharge structures in S.F.'s North Point and Southeast sewerage zones, respectively.

March 14, 1970 - RWQCB adopted Order 70-1, a building permit ban for a majority of the Southeast area of S.F. and on March 26, 1970 by Resolution No. 70-18 the building ban was expanded to downtown and the majority of the remainder of S.F.

May 19, 1970 - RWQCB by Resolution 70-42 lifted the S.F. building ban.

December 1970 - Design of NPWPCP outfall initiated with Brown & Caldwell Consulting Engineers performing design.

July 13, 1971 - Federal government adopts requirement requiring 85 percent removal of 5-day BOD, with a possible waiver for Ocean discharges.

September 1971 - S.F. Master Plan for Waste Water Management distributed.

September 15, 1971 - 1st hearing of the Master Plan before a joint committee meeting, Health and Finance, of the S.F.

Board of Supervisors. Action tabled for a review of the report.

November 30, 1971 - Project Report for 1971-72, Dry Weather Wastewater Treatment and Ocean Discharge, submitted to SWRCB re commending level II treatment for all dry weather flows and ocean discharge.

December 31, 1971 and January 3, 1972 - EPA representatives meet with City staff to solicit a grant application for demonstration of upstream retention basins.

January 26, 1972 - City formally requests a waiver of the 85% BOD requirement for the NPWPCP discharge.

February 3, 1972 - SWRCB modifies 1971-72 Project List to allow the City to study alternative projects for the NPWPCP, ocean or bay discharge.

February 1972 - Master Plan presented to members of S.F. Capital Improvement Advisory Committee.

March 1, 1972 - Master Plan presentation to the members of the S.F.'s Interdepartment Committee on Water Pollution Control.

March 10, 1972 - Grant Application for upstream retention basins submitted to EPA.

March 18, 1972 - A second hearing by the Board of Supervisors' joint committee, Health and Finance, during which the Master Plan was referred to City Planning and Recreation and Park Departments for their review.

March 19, 1972 - A presentation of the Master Plan to the Recreation and Park Commission, who formed a review committee.

April 21, 1972 - EPA denies waiver for NPWPCP outfall for 85% BOD removal.

April 28, 1972 - Dry weather program project application sent to SWRCB. First level treatment and ocean disposal contemplated.

May 15, 1972 - Letter from the Environmental Protection Agency withholding grant funds for the City until a City plan for sewage treatment is approved by the RWQCB.

June 28, 1972 - S.F. presented a recommended Dry Weather Plan to a RWQCB hearing on the Interim Basin Plan.

June 29, 1972 - EIS and Project Report sent to SWRCB. Recommended project included level II treatment for NP and SE combined, abandoning NP site, and ocean discharge of NP-SE-RS waste.

July 6, 1972 - State Water Resources Control Board adopts a new Ocean Discharge Policy.

July 11, 1972 - SWRCB certifies phase I of dry weather program. Includes NP to SE transport and solids handling improvements at SE.

July 13, 1972 - City Planning Commission adopts Resolution No. 6877 approving basic concepts of Master Plan for Waste Water Management.

August 22, 1972 - J. B. Gilbert & Associates appointed to review Master Plan for Waste Water Management. Final report due March 1, 1973

August 1972 - Army Corps of Engineers releases information bulletin on 'triple S' study. Four of five schemes include single wet and dry weather treatment plant at Lake Merced site.

August 30, 1972 - Revised EIS to reflect review of the Department of Fish and Game submitted to SWRCB.

October 5, 1972 - Contract with State for construction grants signed by City.

October 18, 1972 - Federal Water Pollution Control Act Amendments of 1972 passed over Presidential Veto.

October 30, 1972 - Grant Contract with State modified to include wet weather program submission to SWRCB.

December 4, 1972 - City submitted to the RWQCB the anticipated 5 year project needs for updating and extending the Municipal Project Lists 1973-78.

December 4, 1972 - RWQCB tentatively designates areas of biological significance. Seal Rocks are included.

December 13, 1972 - SWRCB amends grant contract with City to separate phase I into two portions. Solids handling portion is approved. Transport portion is being held by EPA pending EPA completion of EIS.

December 14, 1972 - Recreation & Park Commission adopts Resolution No. 9204 approving in principle the Master Plan for Waste Water Management.

December 19, 1972 - AB 740 signed into law. Bill makes Porter-Cologne Act consistent with 1972 FW Pact Amendments and raises State grant percent contribution to 12½%.

December 19, 1972 - RWQCB presents tentative objectives for San Francisco Bay Basin Plan.

December 26, 1972 - Board of Supervisors adopts resolution establishing a citizens committee for public participation in waste water project evaluation and continuing review of the Master Plan concepts.

January 4, 1973 - SWRCB adopts 1972-73 priority list for grant funding due to lack of funds to finance all proposed State projects.

January 11, 1973 - RWQCB adopts orders No. 73-1 and 73-2 amending Cease and Desist Orders for the North Point and Southeast plants.

January 30, 1973 - Board of Supervisors adopts resolution adopting time schedules in RWQCB Resolutions No. 73-1 and 73-2 for both interim and future facilities.

February 1, 1973 - EPA rejects upstream retention basin grant application due to lack of funds.

E R R A T A

The following errata is intended to correct the major errors that occurred in the First and Second Printing of the 3-volume preliminary report entitled "San Francisco Master Plan for Wastewater Management," published on September 15, 1971 by the San Francisco Department of Public Works. The final report will be revised to include these corrections along with additional items that may become apparent as review proceeds:

Errata to Volume 1 -
San Franrisco Master Plan for Wastewater Management
Preliminary Comprehensive Report

First Printing:

1) - Discussion on "Continuing Projects & Status", pages I-19 to 24 were added.

2) - "Preface to 2nd. Printing" was added

3) - All items under Second Printing,

Second Printing:

1) - Format on 2nd. Fly Leaf (4th Sheet from cover) was revised.

2) - Page I-7, at the end of the 2nd. paragraph, the following text were added: "It has also been determined on t is analysis that on the

average year, there is a total of 46 overflow days."

3) - Page I-14, 2nd. paragraph, Line 3, should read: ".....in addition to 36.5 billion gallons of dry weather flow annually."

4) - Page IV-15, 1st. paragraph, Line 14, should read: ".....36.5 billion gallons sanitary waste flow....."

5) - Page IV-41, 2nd. paragraph: The table at the end of this paragraph was revised as follows:

Plant	Sewered area in Acres (A)	Run-off Factor in Percent (C)	(A) x (C)	Percent of Total
NP	7,516	76	5,726	37
RS	9,004	56	4,999	32
SE	7,494	63	4,712	31
TOTAL	24,014	65	15,434	100

6) - Page V-1, 2nd. Paragraph, Line 14 should read: ".....without treatment. 31.1 billion gallons of domestic....."

7) - Page V-2, on the very 1st. Line should read: ".....of overflows annually. 8.2 billion gallons...."

8) - The following were added to the abbreviation index at the end of the report:

AWWF - Average Wet Weather Flow
FOB - Federal Office Building (San Francisco)
PDWF - Peak Dry Weather Flow
SYMAP- Graphical Printout Computer Program
TP - Total Phosphorus

ERRATA TO VOLUME 2 -

San Francisco Master Plan for Wastewater Management

Preliminary Book of Plates

First Printing:

1) - The following plates were revised

Plate IV-17 to 23 - Wastewater Quality Scales

Plate VI-15 - Wet weather cost vs. Accomplishments

Plate VI-18 - Cost and Removal Efficiencies

2) - All items under Second Printing.

Second Printing:

1) - Format on 2nd. Fly Leaf (4th Sheet from cover) was revised.

2) - The following plates were revised:

Plate IV-10A - Pump Station General Information

Plate VI-9 - Schematic of Wet Weather Control

Plate VI-10 - Retention Basin Cross-Section

Plate VII-3 - Master Plan Storage Requirements

Plate VII-4 - Master Plan Retention Basin Dimensions.

ERRATA TO VOLUME 3 -

Appendix to the Comprehensive Master Plan

Preliminary Report

First Printing:

1) - "Foreword" was revised to include the following sections added:

Section 12 - Predicted Effluent Concentration

Section 13 - Master Plan Report vs. Bay Delta Report

Section 14 - Proposed Lake Merced Treatment Processes

Project Staff and Acknowledgment.

2) - The Sub-cover for each Section was revised to include section number for easy identification.

3) - Section I- The San Francisco Sewerage System and its total cost, Page 2, Line 7:
change from "In 1951 to 1952" to "In 1951 and 1952."

4) - Section 3 - Wet Weather Wastewater Loads

a) - Page 4, Table IV-20: Add footnote (1) - Federal Office Building (FOB) raingage.

b) - Page 9, Table IV-22: Delete asterisks shown after July to December 1969, January to June 1970, and July 1969 to June 1970.

c) - Page 12, Table IV-23:
Footnote B - Delete (For storms corrected) and add (Storms Uncorrected from 24-gr. concept.)
Footnote C - add (to activity orientation)

d) - Page 15, Table IV-26:
Footnote 1 - Change "Table IV-20" to "Table IV-22."
Footnote 2 - Change "Table IV-22" to "Table IV-23."

5) - Section 4 - Receiving Water Quality Parameters

a) - Page 1, Line 11: Replace "20 x 10^6" with "29 x 10^6"

b) - Page 1, Line 13: Replace "62 x 10^6" with "6.2 x 10^6"

c) - Page 3, Figure IV-31: Mean MPN/100 M of Dry Weather Receiving Water changed from "3.5 x 10" to "3.5 x 10^2".

6) - Section 5 - The effects of stormwater retention basins upon storm frequencies handled by a combined sewer system.

a) Page 3, Line 7: Change "Table V-13" to "Table V-13A."

b) Page 3, Line 16: Change "Table V-13A" to "Table V-13"

c) Page 18, Table V-13:

Conduit from 44810 to 44800, change Q100 from "136" to "146" cfs.

Conduit from 44810 to 44310, change Q100 from "458" to "487" cfs.

d) Page 23, Table V-14:

Conduit from 44810 to 44800, change 100-year flow for alternate (3) from "136" to "146".

Conduit from 44800 to 44310, change 100-year flow for alternate (1) from "486" to "832" and for alternate (3) from "832" to "486."

7) - Section 6 - Catchbasin survey:

a) - Add the following paragraph: "Catchbasin samples taken from the demographic areas (Figures V-35 thru V-46) are to be the basis of a Citywide extrapolation would be similar to that developed in the Drainage and Watershed characteristics section of this Appendix."

b) - Page 2, Table V-20 to be identified and referenced to the following figures:

Area	Figure
1a - Folsom Street	V-20a
1b - 4th & Bluxome	V-20a
2 - Harrison and 19th	V-20b
3 - Moraga & 25th	V-20c
4 - Tennessee & 19th	V-20d
5 - Divisadero & North Point	V-20e
7 - Plymouth & Sadowa	V-20f

c) - Page 3, Table V-21

Demographic Area designation to be added to table:

a. Low income residential - Plymouth & Sadowa, Webster and Turk.

b. Industrial - 7th and Hopper, Yosemite, lower Selby.

c. Single Family Residential - 40th & Moraga, Upper mission

d. Commercial - Mason and O'Farrell, 32nd. and Taraval, Montgomery.

e. High Income Residential - Marina area.

f. Multiple Family Residential - Haight and Ashbury.

8) - Section 7 - Estimating the Facilities :

a. Page 2, last sentence in first paragraph of Retention Basins Section: Delete "Manifold in rating progressing."

b. Page 5, Line 4: Insert "by a consultant" between "supplied" and "for".

c. Page 13, Bottom of Table V-71: change "S = Profile & OH x 1.25 = $210.64" to "S = Profit and OH = Sum x 1.25 = $210.64."

d. Page 18, Figure V-57 - San Francisco Geologic Map was added.

9) - Section 9 - Flow Projections for the Sewerage System:

a. Page 2, Line 16: Change "Table 3" to "Table 4".

b. Page 3, Table 1: Change the NP effluent flow for 1965 from "15.9" MGD to "51.9".

c. Page 6, Table 4, Footnote 3: Change "Table 3" to "Figure 2."

10) - Section 10 - Sewer Inadequacy Study:

a. Page 2: Replace " " with "VF" in the formula for "C" frictional loss coefficient.

b. Page 4, Line 11: Changed from "0.11" to "0.011."

c. Page 6, Data collections section:

Insert the following as first paragraph:

"Plates 1 thru 4 - summarize for each of the various outfalls tabulated, the total miles of transport sewer investiated, the miles of inadequate transport sewer, and the cost of construction for the noted ranges of adequacy."

Replace c. "high energy grade" with "upper energy grade line elevation."

Replace d. "low energy grade" with "lower energy grade elevation."

d. Page 7: Insert the following as a new paragraph between 2nd. and 3rd. paragraphs: "If a sewer were determined to be between 95% and 100% adequate, no cost of construction was calculated."

e. Plates 52-69 were replaced by new Plate 52-83.

All items under second printing:

Second Printing

1) Format of the 1st. and 2nd. Fly Leaf were revised.

2) Section 11 - Storage capacity vs. Treatment Rate: This section was revised in its entirety.

RECREATION AND PARK COMMISSION

RESOLUTION NO. 9204

WHEREAS, the Recreation and Park Commission having reviewed the Master Plan for Waste Water Management, San Francisco, prepared by the Department of Public Works, does find that a proposed sewage treatment plant to be constructed on a portion of the 43-acre property site adjacent to the southerly portion of the San Francisco Zoological Gardens could be of multiple use to the Department of Public Works and to the Recreation and Park Commission; and

WHEREAS, the Recreation and Park Commission finds that development of the treatment plant site will not significantly diminish the recreational usage of the property, if to the greatest extent possible its construction will be underground; and

WHEREAS, it has been agreed by the Director of Public Works that said development will include parking provisions for approximately 2,200 automobiles and approximately 100 buses, which will be of great benefit to the Recreation and Park Department in accommodating visitors to the Zoo; and that, if legally permissible, 500 paved automobile parking spaces will be developed on the site as soon as all approvals necessary for the use of the property for sewage treatment plant purposes are obtained, which improvements shall be credited toward the total joint use facilities to be financed under the auspices of the Department of Public Works; and

WHEREAS, it has also been agreed by the Director of Public Works that the underground sewage treatment plant structure will be strengthened in order to provide for Zoo improvements, including animal exhibits, to be determined by the Recreation and Park Commission; and that any Zoo facilities in the southerly portion of the San Francisco Zoological Gardens which are disturbed or altered during the period of construction of said sewage treatment plant will be replaced or restored at no expense to the Recreation and Park Commission; now, therefore, be it

RESOLVED, that this Commission does hereby approve in principle the Master Plan for Waste Water Management, San Francisco, prepared by the Department of Public Works, with the following requirements:

1. That the provisions recited above are an integral part of this resolution;

2. That all plans and specifications for the sewage treatment plant to be constructed in the southerly portion of the San Francisco Zoological Gardens, for the development of the sewage treatment site area, and for any other element of the Master Plan for Waste Water Management which shall affect or cross any property under the jurisdiction of the Recreation and Park Commission, shall be presented to the Recreation and Park Commission for review and approval;

3. That a landscape master plan shall be developed for the sewage treatment plant site, with particular emphasis on screening the structure, and shall be presented to the Recreation and Park Commission for its approval;

4. That each increment of the development of the site area shall provide substantial multiple use of the property for recreational or park purposes;

5. That sewage emanating from the Zoo area shall be accepted in the treatment plant as soon as this facility is operating on a continuous wet and dry weather basis;

6. That the sewage treatment plant shall be free of any harmful environmental conditions, such as unpleasant odors, noise, or any other condition which would have a deleterious effect on humans or animals;

7. That roadway alignments shall provide the maximum flexibility for immediate and long-range use of the Zoo, with an emphasis on public convenience and traffic movement; and that consideration be given to multi-use roads to service both the Zoo and the treatment plant;

8. That an agreement relative to maintenance of the sewage treatment plant site, the landscaped areas, and the roadways, shall be prepared by the Department of Public Works and submitted to the Recreation and Park Commission for review and approval;

9. That a formula for the value of the total cost of providing joint use facilities shall be determined by an amendment to the Charter of the City and County of San Francisco, specifically authorizing joint use of the site; and

FURTHER RESOLVED, that the Recreation and Park Commission reserves the right to finance or authorize additional improvements on the site which will not conflict with the aforementioned joint use facilities; and

RESOLUTION NO. 9204 (Continued)

FURTHER RESOLVED, that approval is based on the premise that the Master Plan for Waste Water Management dated September 15, 1971, will comply with adopted standards of the federal, state and regional regulatory agencies; that any changes to that Plan involving additional land area, under the jurisdiction of the Recreation and Park Commission, needed for the existing or proposed treatment plants, or other elements of the Master Plan requiring utilization of other properties under the jurisdiction of the Recreation and Park Commission shall require resubmission of the Plan to this Commission for further consideration.

* * * * * *

Adopted by the Recreation and Park Commission at its regular meeting of December 14, 1972.

SAN FRANCISCO

CITY PLANNING COMMISSION

RESOLUTION NO. 6877

WHEREAS, The Department of Public Works has prepared the Master Plan for Waste Water Management that proposes measures to correct the City's sewerage deficiencies, and

WHEREAS, On March 8, 1972, the Finance Committee and the Health and Environment Committee of the Board of Supervisors jointly solicited from the Recreation and Park and the City Planning Commissions statements on the waste water management plan, and

WHEREAS, The staff of the Department of City Planning has evaluated the plan in terms of its impact on the City and in the light of applicable standards adopted by the appropriate State regulatory agency, and

WHEREAS, The staff report entitled "Report and Recommendations on the Master Plan for Waste Water Management" has been presented to the Commission on July 13, 1972;

THEREFORE, BE IT RESOLVED, That the City Planning Commission approves the basic concepts of the Master Plan for Waste Water Management subject to the conditions and recommendations contained in the aforementioned staff report; and

BE IT FURTHER RESOLVED, That the City Planning Commission takes note of the standards for ocean discharge adopted on July 6, 1972, by the State Water Resources Control Board and further conditions its approval in the following manner:

> Approval is based on the premise that the Master Plan for Waste Water Management, dated September 15, 1971, will comply with adopted standards of the Federal, State, and regional regulatory agencies. Any changes to that plan involving additional land area needed for the existing or proposed treatment plants, additional retention basins, or substantial increase in construction cost that may be required by the July 6, 1972, action of the State Water Resources Control Board will require re-submission of the plan to the Commission for further consideration.

I hereby certify that the foregoing resolution was ADOPTED by the City Planning Commission at its regular meeting on July 13, 1972.

Lynn E. Pio
Secretary

AMENDING ORDER NO. 72-90, REQUIRING THE CITY AND COUNTY OF SAN FRANCISCO TO CEASE AND DESIST DISCHARGING WASTES FROM ITS NORTH POINT SEWAGE TREATMENT PLANT CONTRARY TO REQUIREMENTS PRESCRIBED BY THE CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD, SAN FRANCISCO BAY REGION

ORDER NO. 73-1

The California Regional Water Quality Control Board, San Francisco Bay Region finds that:

A. On September 25, 1969, this Board adopted Resolution No. 69-43 prescribing requirements for the waste discharge by the City and County of San Francisco from its North Point Sewage Treatment Plant.

B. On October 23, 1969, this Board adopted Resolution No. 69-52, an order to cease and desist from violations of requirements.

C. On March 26, 1970, this Board adopted Resolution No. 70-17 to amend Resolution No. 69-43 to make the code references consistent with the Porter-Cologne Water Quality Control Act without making any substantive changes in the specific requirements contained therein.

D. On March 26, 1970, this Board adopted Resolution No. 70-18 to amend and reissue Resolution No. 69-52 to make the code references consistent with the California Water Code.

E. On October 26, 1972, this Board adopted Order No. 72-90, ordering the City and County of San Francisco to cease and desist from continued violation of requirements and rescinding Resolutions Nos. 69-52 and 70-18. That order, in part, also directed the City and County of San Francisco to submit a conceptual plan and time schedule for compliance with all requirements by December 1, 1972.

F. In accordance with Order No. 72-90, the City and County of San Francisco has submitted a conceptual plan and time schedule for compliance with all requirements. That plan identifies the following facilities as necessary for compliance with all requirements.

1. Abandonment of the North Point Plant and construction of transport facilities to take the North Point flow to the Southeast Plant.

2. Enlargement and improvement of the Southeast Plant to provide upgraded treatment for the combined North Point and Southeast flows.

3. Discharge of the combined North Point and Southeast flows either through a new outfall to the Bay or into the ocean through a new outfall near Lake Merced.

G. The Regional Board staff's consultant on this matter, CDM, Inc. has submitted to the Regional Board a report on their findings concerning the schedule for the City and County of San Francisco to comply with waste discharge requirements. In its report CDM has found that full compliance with all present requirements can only be obtained by the construction of second-level treatment facilities. CDM has found that the conceptual plan and time schedule set forth by the City and County of San Francisco represents the minimum time for completion of the Long-range dry-weather program and for full compliance with present waste discharge requirements.

H. While full compliance with all present requirements will require completion of the long-range dry weather program, the construction of the interim outfall diffusers as recommended by CDM will result in significant improvement in compliance with toxicity, floating, and suspended particulate matter, and turbidity and discoloration requirements. It is estimated that the construction of the diffusers can be completed in 18 months.

I. While full compliance with all present requirements will require completion of the long-range dry weather program, the implementation of studies to improve chemical treatment as recommended by CDM could lead to a significant improvement with floating and suspended particulate matter and turbidity and discoloration requirements.

A portion of these studies should involve the testing of mechanical flocculators in one sedimentation tank. It is estimated that this equipment could be installed by mid-October and evaluated by mid-November. If it is found that the use of this equipment does result in a measurable improvement in water quality, then flocculators could be installed in all tanks by mid-August 1974.

J. While the construction of interim facilities will result in significant improvement in water quality, it is not possible to precisely ascertain the amount of improvements in water quality which will be obtained as a result of the construction of the interim facilities as recommended.

CDM's report concluded that the facilities will improve compliance with toxicity, floating and suspended particulate matter, and turbidity and discoloration requirements.

K. On January 11, 1973, at a meeting starting at 9:30 a.m. in the Contra Costa County Water District Board Room, 2700 Concord Avenue, Concord, after due notice to the discharger and all other affected persons, the Regional Board conducted a public hearing at which the discharger appeared and evidence was received concerning the interim improvements, conceptual plan and time schedule.

IT IS HEREBY ORDERED THAT this Board's Order No. 72-90 commencing at Item B, page 3, be and is hereby amended as follows:

B. Compliance with the Board's discharge requirements be completed according to the following time schedule:

Complete design of facilities necessary to remove disinfection induced toxicity	January 30, 1973

Begin construction of facilities necessary to remove disinfection induced toxicity	April 30, 1973
Complete construction of facilities necessary to remove disinfection induced toxicity	September 1, 1973
Complete design of facilities transport North Point flow to Southeast Plant	February 1, 1974*
Begin construction of North Point to Southeast transport facilities	May 1, 1974*
Complete construction of North Point to Southeast transport facilities	June 1, 1977*
Complete design of enlarged primary facilities to accept North Point flows at the Southeast Plant	May 1, 1974*
Begin construction of enlarged primary facilities	August 1, 1974*
Complete construction of enlarged primary facilities	June 1, 1976*
Complete design of second-level facilities to treat combined North Point and Southeast flows	March 1, 1975
Begin construction of second-level treatment facilities	May 1, 1975
Complete 50% of construction of second-level treatment facilities	May 1, 1976
Complete construction of second-level treatment facilities	June 1, 1977
Complete design of Bay or ocean outfall	September 1, 1974
Begin construction of outfall	December 1, 1974
Demonstrate compliance with all requirements	September 1, 1977

*This Regional Board will consider amendment of these dates if the Environmental Protection Agency does not complete its Environmental Impact Statement in six months from the date of this Order which will permit San Francisco to proceed as planned.

C. The Board of Supervisors of the City and County of San Francisco is required to submit to the Regional Board by February 15, 1973, a statement on their intent to implement the interim program recommended by CDM.

D. The City and County of San Francisco is required to provide to the Board by February 15, 1973, and monthly thereafter a report, under penalty of perjury, on progress towards compliance with the provisions of this Order.

E. If, in the opinion of the Executive Officer, the City and County of San Francisco fails to comply with the provisions of this Order, the Executive Officer is directed to request the Attorney General to take the appropriate enforcement action against the discharger, including injunction and civil monetary remedies, if appropriate. In particular, having found that the implementation of interim program recommended by CDM will result in significant improvement in water quality with respect to floating and suspended macroscopic particulate matter, floatables, and color and turbidity requirements, the exact amount of which cannot be ascertained, failure to implement the above interim improvements to improve water quality would be evidence of an intentional violation of this Cease and Desist Order.

This Regional Board further considers any delay in implementing dechlorination and the tests on the flocculation facilities due to attempts to secure construction grants as evidence of an intentional violation of this Cease and Desist Order. The Executive Officer is directed to request the Attorney General to take the appropriate enforcement action against the discharger including injunction and civil monetary remedies in the event that the City and County of San Francisco fails to implement the interim improvements.

F. The Executive Officer is directed to bring this matter to the Regional Board for consideration of a restriction on new connections if there is evidence of increased violations as a result of additional connections to the sewer system.

I, Fred H. Dierker, Executive Officer, do hereby certify the foregoing is a full, true, and correct copy of an Order adopted by the California Regional Water Quality Control Board, San Francisco Bay Region, on January 11, 1973.

_____

Executive Officer

AMENDING ORDER NO. 72-91 REQUIRING THE CITY AND COUNTY OF SAN FRANCISCO TO CEASE AND DESIST DISCHARGING WASTES FROM ITS SOUTHEAST SEWAGE TREATMENT PLANT CONTRARY TO REQUIREMENTS PRESCRIBED BY THE CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD, SAN FRANCISCO BAY REGION

ORDER NO. 73-2

The California Regional Water Quality Control Board, San Francisco Bay Region finds that:

A. On September 25, 1969, this Board adopted Resolution No. 69-44 prescribing requirements for the waste discharge by the City and County of San Francisco from its Southeast Sewage Treatment Plant.

B. On October 23, 1969, this Board adopted Resolution No. 69-53, an Order to Cease and Desist from violations of requirements.

C. On March 14, 1970, the State Water Resources Control Board adopted Order No. 70-1, an Order to Cease and Desist from violations of requirements.

D. On October 26, 1972, this Board adopted Order No. 72-91 ordering the City and County of San Francisco to cease and desist from continued violation of requirements and rescinding Resolution No. 69-53 and State Board Order No. 70-1. That order, in part, also directed the City and County of San Francisco to submit a conceptual plan and time schedule for compliance with all requirements by December 1, 1972.

E. In accordance with Order No. 72-91, the City and County of San Francisco has submitted a conceptual plan and time schedule for compliance with all requirements. That plan identifies the following facilities as necessary for compliance with all requirements.

1. Abandonment of the North Point Plant and construction of transport facilities to take the North Point flow to the Southeast Plant.

2. Enlargement and improvement of the Southeast Plant to provide upgraded treatment for the combined North Point and Southeast flows.

3. Discharge of the combined North Point and Southeast flows either through a new outfall to the Bay or into the ocean through a new outfall near Lake Merced.

F. The Regional Board staff's consultant on this matter, CDM, Inc., has submitted to the Regional Board a report on their findings concerning the schedule for the City and County of San Francisco to comply with waste discharge requirements. In its report, CDM has found that full compliance with all present requirements can only be obtained by the construction of second-level treatment facilities. CDM has found that the conceptual plan and time schedule set forth by the City and County of San Francisco represents the minimum time for completion of the long-range dry-weather program and for full compliance with present waste discharge requirements.

G. While full compliance with all present requirements will require completion of the long-range dry-weather program, the installation of equipment to improve polymer and chemical dosage and the initiation of studies to improve operation, maintenance, and process control as recommended by CDM will result in a significant improvement in compliance with floating and suspended macroscopic particulate matter, floatables, and color and turbidity requirements. It is estimated that the installation of equipment to improve polymer and chemical dosage can be accomplished in six months.

A portion of these studies should involve the testing of mechanical flocculators in one sedimentation tank. It is estimated that this equipment could be installed by mid-October and evaluated by mid-November. If it is found that the use of this equipment does result in a measurable improvement in water quality, then flocculators could be installed in all tanks by mid-August 1974.

H. While the construction of interim facilities and improvement in operation and maintenance of present facilities will result in significant improvements in water quality, it is not possible to precisely ascertain with any degree of certainty the improvements in water quality which will be obtained as a result of the construction of the interim facilities as recommended. CDM's report concluded that the facilities and improvements will improve compliance with floating and suspended macroscopic particulate matter, floatables, and color and turbidity requirements.

I. On January 11, 1973, at a meeting starting at 9:30 a.m. in the Contra Costa County Water District Board Room, 2700 Concord Avenue, Concord, after due notice to the discharger and all other affected persons, the Regional Board conducted a public hearing at which the discharger appeared and evidence was received concerning the interim improvements, conceptual plan and time schedule.

IT IS HEREBY ORDERED THAT this Board's Order No. 72-91 commencing at Item B, page 3, be and is hereby amended as follows:

B. Compliance with the Board's discharge requirements to be completed according to the following time schedule:

Begin construction of facilities necessary to comply with bacterial requirements	January 15, 1973
Complete construction of facilities necessary to comply with bacterial requirements	May 1, 1973
Begin construction of facilities necessary to comply with settleable matter requirements	March 1, 1973
Complete construction to facilities necessary to comply with settleable matter requirements	July 1, 1974
Demonstrate compliance with settleable matter requirements	August 1, 1974

Complete design of enlarged primary facilities to accept North Point flows	May 1, 1974*
Begin construction of enlarged primary facilities	August 1, 1974*
Complete construction of enlarged primary facilities	June 1, 1976*
Complete design of second-level facilities to treat combined North Point and Southeast flows	March 1, 1975
Begin construction of second-level treatment facilities	May 1, 1975
Complete 50% of construction of second-level treatment facilities	May 1, 1976
Complete construction of second-level treatment facilities	June 1, 1977
Complete design of Bay or ocean outfall	September 1, 1974
Begin construction of outfall	December 1, 1974
Demonstrate compliance with all requirements	September 1, 1977

*This Regional Board will consider amendment of these dates if the Environmental Protection Agency does not complete its Environmental Impact Statement in six months from the date of this Order which will permit San Francisco to proceed as planned.

C. The Board of Supervisors of the City and County of San Francisco is required to submit to the Regional Board by February 15, 1973, a statement on their intent to implement the interim improvements recommended by CDM.

D. The City and County of San Francisco is required to provide to the Board by February 15, 1973, and monthly thereafter a report, under penalty of perjury, on progress towards compliance with the provisions of this Order.

E. If, in the opinion of the Executive Officer, the City and County of San Francisco fails to comply with the provisions of this Order, the Executive Officer is directed to request the Attorney General to take the appropriate enforcement action against the discharger, including injunction and civil monetary remedies, if appropriate. In particular, having found that the implementation of interim program recommended by CDM will result in significant improvement in water quality with respect to floating and suspended macroscopic particulate matter, floatables, and color and turbidity requirements, the exact amount of

which cannot be ascertained, failure to implement the above interim improvements to improve water quality would be evidence of an intentional violation of this Cease and Desist Order.

This Regional Board further considers any delay in implementing improved chlorination and the tests on the flocculation facilities due to attempts to secure construction grants as evidence of an intentional violation of this Cease and Desist Order. The Executive Officer is directed to request the Attorney General to take the appropriate enforcement action against the discharger including injunction and civil monetary remedies in the event that the City and County of San Francisco fails to implement the interim improvements.

F. The Executive Officer is directed to bring this matter to the Regional Board for consideration of a restriction on new connections if there is evidence of increased violations as a result of additional connections to the sewer system.

I, Fred H. Dierker, Executive Officer, do hereby certify the foregoing is a full, true, and correct copy of an Order adopted by the California Regional Water Quality Control Board, San Francisco Bay Region on January 11, 1973.

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Executive Officer

SUPPLEMENTARY REPORTS

Ref. No.	Title	Date	Prepared By
1	San Francisco Comprehensive Master Plan Report - Text (preliminary)	9/71	(1)
2	San Francisco Comprehensive Master Plan Report - Book of Plates (preliminary)	9/71	(1)
3	Characterization and Treatment of Combined Sewer Overflows	11/67	(2)
4	Alternate Methods of Effluent Disposal	2/69	(3)
5	Prefeasibility Study - Sewer Tunnel Project for the City of San Francisco	5/70	(4)
6	Chlorination Study - Southeast Plant Dry Weather Flow	9/70	(5)
7	Review of Biological, Literature on Pacific Coast Marine Waste Disposal as a Guide to Prediction of Ecological Effects of a Submarine Outfall in the Gulf of the Farallones (This is printed as part of Reference No. 24)	12/70	(6)
8	Watershed Model and Sewer Model	4/71	(7)
9	Water Quality Transport Model	5/71	(7)
10	Dissolved Air Flotation Project Report	7/71	(2)
11	Dissolved Air Flotation - Appendix A - Preconstruction Studies on Quality and Quantity Relationships of Combined Sewage Flows and Receiving Water Studies at Outer Marina Beach	7/71	(2)
12	Dissolved Air Flotation - Appendix B - Technical Objectives for Field Demonstration of Baker Street Dissolved Air Flotation Facility	7/71	(2)

SUPPLEMENTARY REPORTS (Cont.)

Ref. No.	Title	Date	Prepared By
13	Dissolved Air Flotation - Appendix C - Treatment of and Dilute Raw Sewage with the Dissolved Air Flotation Process - A Pilot Plant Study	7/71	(2)
14	Dissolved Air Flotation - Appendix D - Design Factors for Baker Street Dissolved Air Flotation Facility	7/71	(2)
15	Dissolved Air Flotation - Appendix E - Cost for Dissolved Air Flotation Facilities	7/71	(2)
16	Dissolved Air Flotation - Appendix F - Characterization of the Receiving Water	7/71	(2)
17	Dissolved Air Flotation - Appendix G - Performance Evaluation of Baker Street Facility with Raw Sewage	7/71	(2)
18	Report on Water Pollution Control Plants - Report 1 - Phase I - Existing Operations and Plant Performance	9/71	(3)
19	Report on Water Pollution Control Plants - Report 1 - Phase II - Alternative Treatment Processes for Reductions of Turbidity, Color, Floatables, Grease and Settleable Matter	9/71	(3)
20	Report on Water Pollution Control Plants - Report 2 - Phase I - Reductions Required for Turbidity, Color, Floatables, Grease and Settleable Matter	9/71	(3)
21	Report on Water Pollution Control Plants - Report 2 - Phase II - Alternative Treatment Processes for Reductions of Toxicity and Biostimulants	9/71	(3)
22	Report on Water Pollution Control Plants - Report 3 - Phase I - Reductions Required for Toxicity and Biostimulants	9/71	(3)

SUPPLEMENTARY REPORTS (Cont.)

Ref. No.	Title	Date	Prepared By
23	(Not used)		
24	City & County of San Francisco, A Predesign Report of Marine Waste Disposal, Oceanographic and Base Data Acquisition and Evaluation of Alternate Locations	9/71	(3)
25	Survival of Dungeness Crab Larvae in Two Concentrations of San Francisco Sewage Effluent (This is printed as part of Reference No. 24)	2/70	(8)
26	Interim Water Quality Control Plan, San Francisco Bay Basin	6/71	(9)
27	San Francisco Bay Delta Water Quality Control Program, Final Report	6/69	(10)
28	City and County of San Francisco Sewerage System - Basic Data Development (Land Use and Population)	6/71	(1)

(1) San Francisco Department of Public Works

(2) Engineering-Science Incorporated

(3) Brown and Caldwell

(4) Bechtel Incorporated

(5) URS Research Company

(6) Dr. Wheeler J. North

(7) Water Resources Engineers, Incorporated

(8) Dr. George Schuman, Marine Associates

(9) California Regional Water Quality Control Board San Francisco Bay Region

(10) Kaiser Engineers

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